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THE EDITOR'S PAGE

Purposes and Prospects

The Editor's Page is being launched in this issue and will be a recurring feature. It has two purposes. One is to keep readers informed about our editorial policies and practices and their effects. The other is to provide commentary on issues and developments related to research in education. Pursuit of these twin purposes is intended to aid in understanding, perhaps even influencing, factors shaping the nature and direction of educational research. That AJER has in the past mirrored many, and helped to mold a few, of these factors is well-documented.¹ To do so in the future is our continuing challenge and opportunity.

Thus in accordance with the first information purpose, subsequent Pages will report on characteristics of current and potential audiences and contributors, analyze the nature of the articles being published and the research methods used, and examine the manuscript pool and the review process. Pursuant to the second commentary purpose, concerns to be addressed will include the influence of major events, public policies and attitudes, and resource allocations; trends in the preparation and deployment of research scholars and technicians; gaps in knowledge and needed research; and the uses of research by elected officials and educators.

From consideration of topics like these will come some modifications in the goals, policies and practices of AJER. May the end result be a tomorrow as bright and as notable as yesterday!

Turning to today, there is an increase in the price of AJER. But it continues to be a "bargain." Consider these facts:

- The average subscription price of 203 education journals published in the United States in 1984 was \$34 (US). AJER's price was \$12 (CAN).
- A subscription to AJER in 1984 cost less than any other comparable periodical published in Canada.
- The price of AJER in 1985 is still less than most other similar publications.

Currently, 60 percent of our subscribers are located in Canada, 20 percent in the United States with the remainder (rank ordered by number) in Europe, Australia, Africa, India, the Pacific Rim, New Zealand and South America. About 65 percent of these are institutional subscribers, mostly libraries.

We hope that you will all stay with us and soon be joined by many others. For as before, AJER is where you get a little bit more.

WHW

¹Hersom, N. (1980). Twenty-five years of research in education: The Alberta Journal of Educational Research 1955 to 1979. *The Alberta Journal of Educational Research*, 24(4), 262-275.

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School Principals as Threshold Guardians: An Exploratory Study

This study was an examination of secondary school principals' threshold guardian behavior. Forty-five principals were interviewed concerning their experiences with and perceptions about serious incidents of teacher misconduct. The principals guarded the thresholds of misconduct, attempting to head off, dampen, and contain such incidents. They preferred to resolve incidents in-house, but resorted to formal sanctions when necessary.

Findings suggested limitations to the concepts of loose coupling, the logic of confidence, and ritualistic legitimation. Legitimation for school organizations is ordinarily problematic, not assured. Teacher behavior that could threaten legitimation is circumscribed, and teachers preserve leeway by avoiding threshold areas where behavior and supervision are tightly coupled.

It has long been recognized that public schools are organizations that give expression to the dominant values of their communities. In his classic work on education written more than 50 years ago, Willard Waller (1932) described schools as "museums of virtue."

Virtue is socially defined and the community is a major source of normative content for the schools. As numerous writers have pointed out (e.g., Meyer & Rowan, 1978), schools reflect the values of their larger environments. Moreover, as public organizations, schools are politically vulnerable, and school personnel

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ordinarily are wary of activities that substantially diverge from community values and expectations.

Teacher misbehavior represents one kind of potential threat to the school-community relationship. School administrators appear to be quite alert to such potential threats. Willower (1982) has argued that while the supervision of teachers by school principals often occurs with a light touch, these administrators look out for potential problems and are ready to take action when the problems become serious enough. He referred to school administrators as threshold guardians because they monitor what goes on in their organizations and attempt to anticipate and dampen behavior that seems likely to cross the thresholds of impropriety. In his view, a major concern of the administrators is the maintenance of organizational legitimacy, which he describes as problematic rather than assured.

The Study

The present inquiry was designed to gather exploratory data on these ideas by interviewing secondary school principals. The general purpose of the study was to examine principals' perceptions of the incidence and character of teacher misconduct, and the manner in which the principals learned about and reacted to it.

More specifically, we were interested in what principals perceived to be teacher behavior that was damaging to the school with the community and what they saw as teacher behavior that was helpful to the school with the community. In addition to these depictions of behavior that presumably reflected perceived community norms, the principals were asked to describe, from its inception to its conclusion, an incident of serious teacher misbehavior with which they had to deal. The principals were also queried about the frequency of teacher misconduct, how they found out about such cases and how they handled them, including their timing. Their perceptions of whether certain types of teachers were more likely to engage in aberrant behavior were probed as well.

An interview schedule consisting of 21 open-ended questions was the main data gathering device. The questions were straightforward and directly on the content just sketched. For example, on harmful and helpful teacher behavior, the principals were asked to "Name some teacher behaviors that you think help the school's image in the community" and "Name some teacher behaviors that you think would damage the school's image in the community." On the specific incident of misconduct, the main question was "Describe a serious incident of teacher misbehavior which happened during your current principalship." Accompanying probes were "When did this incident happen?" "How did you learn of this incident?" "How did you resolve the situation?" "Did members of the community learn of this incident before you did?" If yes, "What was their reaction?" and "If left uncorrected by you, how would this incident have affected your school in the community?" For a copy of the interview schedule and details on other aspects of the research see Stetter (1983).

The initial form of the interview schedule was piloted with four principals, and some revisions were made. In addition, the decision was made to take handwritten notes rather than use a tape recorder. Both techniques were tried during the pilot interviews; the former was less obtrusive and the principals appeared more comfortable with it.

The Sample

The sample of public school principals interviewed was selected from all senior high school and combined junior-senior high school principals in a diverse seven

county area of a large northeastern state. The 91 such principals in this area were numbered from 1 to 91 and, using the simple random draw procedure described by Loether and McTavish (1976), numbers were drawn until all of the principals were chosen.

In order to obtain a sample of 45 interviewees, the first 60 principals identified in the random draw procedure were contacted by letter about participation in the research. Fifty-five replied and 48 agreed to participate. Three were dropped to bring the group into closer agreement with state-level data on the distribution of school district enrolments.

All 45 principals were males. Their mean age was 45.4 years. The average principal had held his current position for 6.5 years, had 8.7 years experience as a principal, and a total of 22.6 years in education. Based on median categories, the typical principal headed a school of from 1,000 to 1,500 pupils with 40 to 60 faculty members including one assistant principal. The communities served by the principals' schools were characterized by them primarily as suburban in 16 cases, as rural in 15, as small town in 12, and as urban in two.

The characteristics of the interviewees approximated those found in national and state studies which show that secondary school principals tend to be males in their 40s. In addition, school district-wide student enrolments, a variable often associated with other organizational characteristics, were distributed in the present sample in a way that closely approximated the distribution for the entire state, although the sample was slightly overrepresentative of larger districts.

Data Collection

Each of the 45 principals was interviewed at his school, usually in his private office. The sessions took from one-half hour to one hour. Interview responses which seemed incomplete or ambiguous were probed following Kidder's (1981) guidelines for neutral follow-up. All of the interviews were completed during January and February 1983.

Findings

Since this study was exploratory and the interview questions largely open-ended, predetermined categories of analysis were not used. Instead, the written accounts of the interviews were analyzed in order to formulate categories which in turn could facilitate interpretation. This method has been used in qualitative research and hypothesis-building by Glaser and Strauss (1967).

Teacher Misconduct: Incidents Recalled

In response to the question about a serious incident of teacher misbehavior occurring during their current tenure, the principals overwhelmingly recollected incidents having to do with students. Thirty-two (71.1 percent) of the principals provided this kind of response which was labeled "student welfare jeopardized." The typical incident in this category was teacher use of harsh or Draconian discipline, although there were a few cases of teachers who used drugs or had affairs with students, and one unlikely case of a teacher who exposed himself before a class.

Two additional types of incidents were recalled by the principals. One dealt with more general norms and the other involved organizational processes or rules. Respective examples were extramarital attachments between teachers, and the misuse of school funds or of sick leave. However, only four principals described

incidents of the former kind and only three described incidents of the latter type. Six of the school administrators, all relatively new in their present positions, said they had experienced no incidents of serious teacher misbehavior. Most of the principals reported quite recent events. One-third of the incidents occurred during the current school year and nearly two-thirds occurred within the past two years.

Thirteen of the principals first learned of the episodes they described from parents, twelve from teachers or other staff members, eight from students, and four from their own observations. One was informed by his superintendent and another by a fellow principal. Put differently, it could be said that all but two of the principals' sources were from within their own school-communities, the exceptions being the two administrators outside the sphere of the particular schools, but within the school districts. On the other hand, if parents and students are defined as organizational outsiders, then the principals' initial sources are divided fairly evenly between outsiders and insiders. In any event, the principals were among the "first to know"; 70 percent of those dealing with incidents believed they learned about them before community members did.

The principals' responses to the problems represented by the incidents they recounted took four forms—investigation, consultation, unofficial action and official action. All of the principals involved in incidents took some action. Indeed, almost 90 percent of them believed that if they did not correct the situation, their schools would be negatively affected in the community. The responses suggested that the principals quickly "took charge" especially during the early phases of the case. More than two-thirds of them investigated the situation by directly interviewing involved persons, particularly the teacher-protagonist. Nearly 60 percent of the principals dealing with incidents eventually initiated some sort of unofficial action and 46 percent initiated official action. Examples of the former were conferences directed toward resolving the problem, or changing the schedules of teachers or students. Examples of the latter included letters of reprimand, unsatisfactory ratings, temporary suspensions, transfers or, as occurred in eleven cases, dismissal by the board of education.

The principals appeared to prefer to resolve the problems "in-house" when possible. As one stated, "Once it leaves the building, the principal and faculty lose control of it." Only eleven of the principals mentioned consultation with others in the school hierarchy. Those who did consult, overwhelmingly did so with the superintendent. However, the initiation of formal action involving the school board changed the principal's role from that of case manager to participant, often as a witness at a formal hearing.

Put briefly, when the principals were asked to describe a serious incident of teacher misbehavior, they recalled quite recent cases most of which involved teacher actions that jeopardized student welfare. The principals learned of these incidents early from persons close to their schools. They responded quickly and directly to head off the adverse effects on their organizations that they foresaw if they failed to act. They attempted to resolve the problems quietly without bringing in outsiders, but when necessary they resorted to official sanctions in broader arenas.

So far, the principals' reports on one incident each of them faced have been explored. Next, their more general perceptions of teacher misconduct and its social and organizational contexts are examined.

The Principals' Perceptions

The principals' perceptions of community expectations for teachers were indirectly tapped by asking them to name some teacher behaviors that would help the

school's image in the community, and to name some that would damage the school's image. Helpful in-school teacher behaviors were named by 38 principals. Almost half of the total of 96 behaviors mentioned by these principals involved teacher contributions to the school that went beyond the classroom and required after-school time commitments like sponsoring student activities, coaching or attending school events. Other major categories of helpful behavior cited by the principals were communicating with parents on student progress and having a positive attitude towards students. Helpful teacher behaviors in the community were given by 33 principals who mentioned 74 examples. More than 85 percent of these examples described teacher involvement in community affairs such as in civic clubs, volunteer work, and church and governmental activities.

Damaging teacher behavior noted by the principals also could be dichotomized in terms of those that were internal to the school and those that were external or community based. Thirty-seven of the principals provided 59 wide ranging illustrations of damaging in-school behavior. Shortcomings in classroom instruction and grading practices comprised the largest categories of these behaviors, while others included inappropriate strike or bargaining tactics, failure to communicate with parents or hostility towards them, offensive language or angry outbursts before students, and minimal involvement or refusal to become involved at all in extracurricular activities. Damaging behaviors in the community were mentioned 65 times by 32 principals. More than half of these principals stressed the harmful effects to the school when improper teacher behavior was displayed openly or generated publicity; brawling, drunkenness, extramarital affairs, involvement with drugs, and even criminal arrest and prosecution were given as examples. Failure to become involved in the community or even live in it were some less dramatic types of behavior cited by smaller numbers of the administrators.

The principals were asked how many times during the previous school year they learned of incidents of serious misbehavior by a member of their faculty. Seven principals who were not in their current positions at that time did not respond. The largest response, by 50 percent of the rest of the administrators, was "no incidents." Eleven of the principals reported one or two incidents and eight reported three or more. A number of principals commented on the changing times. One stated that "the [turbulent] late 60s had an impact on the staff . . . it matured them." Another noted that "the teacher market has changed. The majority are committed to education . . . know their rights . . . (and) how to solve misunderstandings." A third pointed out that "job security problems force teachers to reconsider attitudes toward the job. I've seen a change in the last two years."

If teacher misconduct is infrequent, is it confined to a certain type of teacher? More than 90 percent of the principals believed that it was. They described these teachers both in terms of their teaching and their personalities. These teachers were characterized as unable to deal with students, having poor classroom management, using unethical or unprofessional judgment, and being irresponsible and not committed to teaching. They were further depicted as defensive, impatient and aggressive, immature and insecure and given to overreaction, and as inflexible and intolerant and vulnerable to stress and frustration. The principals furnished 67 responses essentially of the kinds just listed. A typical principal called such teachers "escapists." He said that "they enter teaching as a last resort. They're not motivated or enthusiastic. They're vulnerable to discipline problems and they create adversarial relations."

We turn now to the principals' sources of information and courses of action relative to the typical case of teacher deviance. When asked how they usually learn of

teacher misbehavior, 26 principals mentioned teachers and staff, 17 mentioned parents, 12 mentioned students, 12 spoke of general contacts, 9 named the superintendent or school board, and 2 mentioned their own observations. As was the case with the single recalled incident described earlier, the principals overwhelmingly said that they got their information from sources within or close to their school communities. Teachers, staff, and parents are still the principals' leading sources, but the teachers and staff replace parents as the primary source in the typical as opposed to the single actual situation.

However, when the principals were questioned about how they usually learned that the community was upset by a teacher's conduct, 25 of them indicated parents as their source, while only 11 mentioned teachers and staff. Eighteen of the principals said the superintendent or school board was a typical source, but only three mentioned students. Twenty-eight of the principals also referred to such media as "personal contacts," letters, and telephone calls.

The Principals' Actions

Considered next are the principals' reports of their typical responses to teacher misconduct, including the extent to which they handled or referred such incidents, their initial actions, their timing, and their main objectives in such cases. Finally, the activities the principals engaged in to hold incidents to a minimum are explored.

The principals saw themselves as responsible for their organizations and their personnel. As one of them put it, "The responsibility for staff is mine." Moreover, the principals believed this to be in keeping with the expectations of others. One stated that "the district has an expectation that I'll handle incidents with teachers," and another remarked that "our superintendent wants us to be the front line." In fact, when the principals were asked if there were incidents of teacher misbehavior that they would refer immediately to the district central office, 85 percent said "no." The seven administrators who replied in the affirmative cited extreme incidents such as teacher arrest on criminal charges. However, the large negative response did not mean that the district office remained uninformed. Two typical comments were "I'll handle it and inform the superintendent" and "I have to tip off the superintendent so he's not surprised by a phone call, but I have to look into incidents first."

As was the case with the recalled incidents, the principals reported that they typically entered the action early using quite direct approaches. All 45 principals indicated their first step was to investigate the situation, ordinarily by meeting with the involved teacher. Although direct and speedy intervention appeared to be their favorite mode of operation, in response to a question about timing, more than 90 percent of the principals indicated that the rapidity of their reactions depended on their assessment of the severity of the situation or their estimates of its potential for damage.

The principals were queried about their main objectives when taking action in a case of teacher misbehavior. All 93 of their responses could be grouped in two closely related categories. One stressed dampening and containment, the other centered on resolution of the problem. The principals wanted situations of this kind to be dealt with and concluded, but they wanted it done in ways that would "save face," reduce the likelihood of future incidents, and preserve the integrity and reputation of their schools.

Finally, the principals were asked to name some activities that they found helpful in holding cases of teacher misbehavior to a minimum. More than 95 percent of

the administrators cited activities that promoted positive teacher behavior through cooperative and supportive means. Examples included maintaining communication with teachers, being accessible to them, counseling them, encouraging them and briefing them on expectations. Almost 45 percent of the principals also mentioned monitoring or investigative activities. Specific activities of this sort cited were maintaining high visibility in the school, observing classrooms, being alert to possible problems and promptly looking into them.

Discussion

Our findings are based on the self reports of a carefully chosen but relatively small sample. Thus, many of our interpretations are essentially hypotheses with some tentative empirical support and some of them are more purely speculative. With these caveats, we turn to a discussion of the study.

The bulk of the recalled incidents dealt with inappropriate teacher behavior toward students, and there was substantial mention by the principals of hypothetical student-related "damaging" teacher behavior. Both suggest a trend towards more role-specific norms for teachers. Primary attention was given to teachers' work with and relationships to students. To be sure, the interviews showed unmistakable vestiges of a more diffuse concern for teacher "morality," but the guise was a modern one. The concern was not so much with teachers' private lives as it was with teachers as examples for students and as persons who should behave in ways that earn the respect of the students and the community.

The principals appeared to have developed a sense of the limits of acceptable teacher behavior based on their perceptions of community expectations and their own values, both general ones and those keyed to schools and educational matters. As heads of public and politically vulnerable organizations with a young and impressionable clientele, they frequently exemplified the rule of anticipated reactions (Friedrick, 1937), dampening and containing situations that they believed would elicit negative reactions, especially from parents and the community. Once an incident had taken place and the principals had determined that the thresholds of deviance had been crossed, they moved swiftly to protect their organizations. In doing so, they attempted to find internal solutions that generated a minimum of talk and publicity. They informed their superiors of serious cases, but they reserved to themselves as much leeway for action as possible under the circumstances and tried to "keep the hounds away from the superintendent's door" as one of them put it.

The principals in the present sample could be characterized as threshold guardians. The behavior they reported indicated that they were sensitive to and, when necessary, actively engaged in countering teacher misconduct that could threaten the legitimacy of their organizations in the community. They knew what was happening and even what was allegedly happening in their schools because sources within or close to their organizations brought them information which they checked and pursued if they felt it was warranted.

Meyer and Rowan's (1977, 1978) account of institutional organizations stresses ritual legitimation and the logic of confidence. They contend that schools are creatures of the society, reflecting societal values and conforming to uniformity-inducing societal controls, a view that is consistent with the results of the present study. According to Meyer and Rowan, society both regulates and legitimates the schools through ritual classifications such as the credentialing of personnel and the accreditation of programs. Such categories are institutionalized in the larger society and mirrored in the schools' organizational arrangements. Ritualistic legitimation

goes with what Meyer and Rowan call the logic of confidence or the assumption of good faith, in this case, that school personnel are carrying out their duties in an appropriate manner.

Institutionalization and the logic of confidence enable school activities to be loosely coupled or decoupled without dire consequences for the organization. Thus, supervision and instruction, or instruction and learning outcomes can be decoupled because schools are ritually legitimated and because it is assumed that participants are doing what they should be doing. Meyer and Rowan's approach blends external consensus about schools with internal dissensus, and Meyer and his colleagues (1978) have empirically examined school administrators' and teachers' perceptions of school policies, rules, and practices and interpreted the results as reflecting internal loose coupling in schools. Weick (1976, 1980) has also depicted educational organizations as loosely coupled systems, but he has not employed an institutionalized organizations perspective.

The present study suggests some speculations concerning the notions of ritualistic legitimation, the logic of confidence, and loose coupling. These concepts appear to neglect the internal monitoring described in the principals' interviews. This monitoring, which is probably common to a variety of public organizations, is directed to the maintenance of the organization's external legitimation, that is, to its legitimation in the larger community. Such monitoring is hardly consistent with the idea of a logic of confidence. In fact, the maintenance of confidence and legitimation appeared to be genuinely problematic for the principals, not something that was ritualistically given. Their depictions of incidents of teacher misconduct were full of portrayals of administrative efforts to protect and sustain their schools' reputations and positions in the community. The stories that they told clearly implied that legitimacy is never final or permanent, but must be protected and sometimes even regained.

The paucity of serious cases of teacher misconduct reported by the principals is consistent with the idea that teachers are aware of the rules of the game and ordinarily abide by them (Willower, 1982). If this is so, it indicates certain limits to the notion of loose coupling. For one thing, a counter explanation for what appears to be loose coupling is suggested. Teachers protect their autonomy by accepting limits, and by recognizing and not crossing thresholds. This permits principals to enjoy cordial relationships with teachers and it permits teachers to enjoy considerable leeway in their work. At the same time, the organization is protected. Clearly, when teacher behavior approaches the thresholds of impropriety, administrator intervention is highly likely. The area of thresholds is characterized by the tight coupling of administrative supervision and teacher behavior.

The present study indicates that the theoretical insights provided by the loose coupling concept and by the institutional organizations perspective have limitations. The blanket designation of educational organizations as loosely coupled is misleading. This concept and the concepts of ritualistic legitimation and the logic of confidence shift attention from what appears to be a key feature of public school organizations. This key feature is the activity devoted by members of these organizations to mechanisms that protect their schools' legitimacy. Our work suggests the importance of problematic legitimation and bounded leeway. It further suggests a symmetry to these two concepts. Leeway is bounded sharply by proscriptions on behavior that is perceived to contain potential threats to legitimacy.

Public schools are special kinds of organizations. In a sense, they belong to their communities; every individual and interest group has a legitimate right to criticize these organizations that have stewardship over the community's children and

youth. We need a better understanding of how autonomy and constraints are blended in these organizations, and how social changes such as the increasing pluralization of society, teacher unionization, and shifts in dominant community norms influence that blending.

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Environmental Effects on Educational Performance

The relative influences of the environment on educational performance were investigated. Representative samples of 392 seven-year-old and ten-year-old elementary school children were tested on measures of intelligence, reading, and mathematics. For the samples, 95 environmental measures of the school, neighborhood, home, parental attitudes towards education, and parental behaviors regarding education were subjected to factor analysis and reduced to 28 composite environmental variables. The measures of educational performance were statistically set against the measures of the environment by means of both factor analysis and regression analysis. The results demonstrate convincingly the overwhelmingly close associations between the home environment and variations in educational performance as compared to the minimal influences of the school and neighborhood environments; that within the home environment, the parents and not the material surroundings, are the important influences; that parental behaviors and not parental attitudes are the important predictors of educational performance; that the best individual environmental predictors of educational performance are home literacy, educational ambition, and socio-economic efficiency; that the environment has more impact on measured intelligence than it has on attainments; that the environment has more effect on reading than on mathematics; and that the impact of the environment gets progressively stronger with age.

The study of the environment and its relative effects on human development has always been of considerable interest to educators and psychologists. The multitudes of issues involved have been investigated through the decades with increasing intensity and sophistication. The aspects of human development which have aroused a considerable amount of this interest are those related to intelligence and educational performance. The ubiquitous nature-nurture controversy has resulted in a huge body of literature on the heritability of intelligence, from the earliest family pedigree surveys (e.g., Galton, 1869; Dugdale, 1877; Goddard, 1912), through the twin studies (e.g., Holzinger, 1929; Hirsch, 1930; Blewett, 1954; Nichols, 1964), the

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progressive environmental effects studies (e.g., Asher, 1935; Bayley, 1940; Wheeler, 1942), the foster children studies (e.g., Burks, 1928; Leahy, 1935), and the institutionalized children studies (e.g., Goldfarb, 1944), to its rekindling by Jensen (1969). Environmental influence on educational performance has been investigated through studies of socio-economic status (e.g., Shaw, 1943; Coster, 1959; Banks, 1958; Swift, 1965), language and culture (e.g., Bernstein, 1961; Bereiter, 1965; Metfessel, 1966), rural-urban differences (e.g., Klineberg, 1935; Gist & Clark, 1938; Lee, 1951), the school environment (e.g., Kemp, 1955; Mollenkopf, 1956; Douglas, 1964; Wiseman, 1967), the neighborhood environment (e.g., Thorndike, 1951; Schutz, 1960; Wiseman, 1964), the home environment (e.g., Fraser, 1959; Wiseman, 1967), and parental attitudes (e.g., Griffiths, 1959; Pidgeon, 1959; Fraser, 1959; Dave, 1963; Wolf, 1964; Morton-Williams, 1967). These are only some of the major studies about environmental influence on educational performance. They generally raised more questions than they provided answers, and revealed the need for more detailed research for further clarification.

The present study was carried out in 1970 in Northern Ireland and was concerned with examining the major findings and implications from the literature to that date, with establishing hypotheses from the results of these studies, and with testing these hypotheses in as comprehensive and statistically refined ways as possible. It focused on the relationship between intelligence and the educational performance of elementary school children and environmental factors, including school, neighborhood and home factors, with particular reference to the behaviors and attitudes of parents towards education. The purpose of the investigation was to statistically "set" the measures of educational performance against the measures of the environment, and to observe which aspects of the environment show the closest association with the educational measures. Although from another time and place, these previously unpublished findings are still very relevant to those examining environmental effects at this time and in any geographical context. In North American literature, for example, the topic of environmental effects has been and continues to be a lively area of concern (e.g., Coleman, 1966, 1975; Keogh & Smith, 1970; Kohn & Rosman, 1974; Feshback, Adelman, & Fuller, 1974; Evans, 1976; Kellaghan, 1977; Edwards, 1981; Archer & Edwards, 1982). This report may throw some light on issues now being examined in North America, may suggest comparative studies in view of its findings, and may raise questions which still need to be answered within the North American context.

Examining the evidence to date, with special attention to the most comprehensive of the environmental studies in this geographical area, ten hypotheses were formulated regarding educational performance and the environment:

Hypothesis One: that the School environment should show little association with educational performance by comparison with Home environment (Wiseman, 1967).

Hypothesis Two: that within the School environment, "organizational" as opposed to "physical" variables should have the most marked association with educational performance (Wiseman, 1964; Warburton, 1964; Douglas, 1964).

Hypothesis Three: that the Neighborhood environment should show little association with educational performance (Wiseman, 1967).

Hypothesis Four: that the Home environment should show the closest associations with educational performance (Wiseman, 1967).

Hypothesis Five: that within the Home environment, psychological indices should show a closer association with educational performance than physical indices (Wiseman, 1967; Fraser, 1959).

Hypothesis Six: that Parental Attitudes towards education should be most impor-

tant with regard to educational performance (Wiseman, 1967; Morton-Williams, 1967; Peaker, 1967).

Hypothesis Seven: that within the Attitude environment, Parental Behaviors reflecting attitudes should have a closer association with performance than the pure attitudes (Wiseman, 1967; Peaker, 1967).

Hypothesis Eight: that environmental forces have a greater effect on attainment than on intelligence (Fraser, 1959).

Hypothesis Nine: that environment has a greater effect on reading than on arithmetic (Warburton, 1964; Wiseman, 1964, 1967).

Hypothesis Ten: that the impact of environmental forces will get progressively stronger with age (Douglas, 1964; Peaker, 1967).

Method

Subjects

Three hundred and ninety-two children were selected from a representative sample of elementary schools in Northern Ireland. Northern Ireland was chosen as presenting a relatively distinct social and geographical unit. The sampling procedure had two stages, the actual technique used being that of stratified random samples with sub-samples drawn in the proportion of 1 in 10 from each stratum, providing a self-weighting sample. First, representative samples of elementary schools, randomly selected in the proportion of 1 in 10, were drawn from all the Northern Ireland elementary schools. The samples were drawn so as to have regard to school size, geographical location, and managerial designation. For school size the sample was representative of schools which had (a) up to 75 students, (b) 76-200 students, (c) 201-500 students, and (d) 500+ students. Geographical location was determined by the six counties and the two county boroughs of Northern Ireland. The administrative designation of County, Voluntary, and Maintained elementary schools was employed. This resulted in an initial sample of 115 elementary schools.

Two age levels of students were investigated, 7-plus and 10-plus. These age levels were chosen as representing the lower and upper divisions of elementary schooling. All those children on the rolls of the 115 elementary schools who were born between August 1, 1962 and July 31, 1963 and between August 1, 1959 and July 31, 1960 were included in the initial sample. From the 115 schools sample, 20 percent or 26 schools were randomly selected. All of the 7-year-old and 10-year-old students attending these 26 schools were given a number and, using a table of random numbers, 100 7-plus girls, 100 7-plus boys, 100 10-plus girls and 100 10-plus boys were selected. This number was reduced, due to loss of information on other measures, to a final sample of 392 students, 99 7-plus girls, 97 7-plus boys, 99 10-plus girls and 97 10-plus boys. Comparisons on school size, geographical location, managerial designation and social class showed this final sample to be representative of Northern Ireland school children.

Measures of Attainment and Intelligence

The 392 elementary school children were administered group tests of verbal and nonverbal ability, reading and mathematics. The three tests used at the 7-plus level were: Moray House Picture Intelligence Test (7+); National Foundation of Educational Research (NFER) Reading Test (7+) Form NS45; and NFER Junior Mathematics Test A1. The four tests used at the 10-plus level were: NFER Non Verbal Test 5; NFER Primary Verbal Test 2; NFER Primary Reading Test 2; and NFER Junior Mathematics Test C3. All the tests, except the Moray House Picture Test, had been restandardized for Northern Ireland to a mean of 100 and a stand-

ard deviation of 15 by the Northern Ireland Council for Educational Research (1971).

Measures of the Environment

The information on the School, Neighborhood, and Home environments was obtained by questionnaires and rating scales, completed by Principals, Teachers, the Inspectorate, Educational Welfare Officers, and Health Visitors. Information on Parental Behaviors and Attitudes with regard to education was gathered by means of a questionnaire, the parents (usually the mother) being interviewed in their own homes.

There were 31 school variables, including measures of the physical characteristics of the school, the staff, school policy, and teaching emphasis. There were 6 neighborhood variables, including ratings of the characteristics of the school neighborhood, housing, facilities, and status. There were 16 home environmental variables, including measures of social class, type of dwelling, income, and cleanliness. A 40-item questionnaire was used to obtain behavior and attitude information from the parents of the 392 school children. This was derived from the Morton-Williams Survey (1967) but drastically reduced in light of her factor analysis. Only those variables were retained which had factor loadings of over 0.45. In other words, only those attitudes and behavioral correlates from the Morton-Williams Survey which were good measures were retained. The second stage of the development of the questionnaire involved the structure and mode of expressing these variables. It was felt that it was important to consider not only attitudes or effect, but also the indicants of attitudes—beliefs, behavioral intentions, and behavior. Therefore the questionnaire was in two parts. The first part contained Behavioral Correlates, the actual behaviors such as school starting age and library membership, and behavioral intentions such as preferred school leaving age. The second part contained pure Attitude statements, fulfilling the criteria for the selection of statements set down by Likert (1967).

There were also two variables relating to each student, only one of which could be said to be open to environmental influences. These were sex of student and student attendance at school.

Altogether there were 95 environmental variables. The variables relating to the “school and neighborhood” environment, the variables relating to the “home” environment, and the variables relating to the “parent” environment were subjected to factor analysis. A Principal Components Analysis, followed by a Varimax rotation, reduced the variables in each of these environmental categories to a much smaller number of “factors,” while still retaining the essential information of the original single variables. Thus there was a School Analysis, a Home Analysis, and an Attitude Analysis, which reduced the original 95 single environmental variables to a more manageable set of eight School Conditions, two School-Neighborhood Conditions, two Neighborhood Conditions, four Home Circumstances, four Parental Behaviors, four Parental Behavioral Attitudes. These composite environmental variables with their highest loading individual environmental variables were as follows:

The School

1. New, well-equipped schools (classroom adequacy [.908]; age of school [.888]; pupil amenities [.850]; school equipment [.662]).
2. Formal methods (mathematics teaching [.784]; reading teaching [.695]; social atmosphere [–.648]).

3. Overcrowding and streaming (pupil/teacher ratio [.769]; average class size [.753]; floor space [-.752]; streaming [.572]).
4. Homework (homework policy [.862]; out-of-school activities [-.496]).
5. Teacher stability, older teachers (turnover rate [.837]; age under 30 [-.703]; age over 50 [.484]; married women [.310]).
6. Graduate teachers (graduate trained [.845]; infant trained [-.353]; age over 50 [-.322]).
7. Superior library provision (school library provision [.778]).
8. Married women teachers in girls' schools (married women [.808]; sex of school [-.482]).

The School-Neighborhood

1. Voluntary schools (County/Voluntary [-.761]; free meals [.665]; father's employment [.631]; age of entry [-.441]).
2. Large schools with superior neighborhood facilities (neighborhood library facilities [.716]; clubs and organizations [.710]; recreational facilities [.671]; size of school [.670]).

The Neighborhood

1. Neighborhood status (housing [.866]; working status [.842]; unemployment [-.459]).
2. Attendance (percent attendance [.810]; teachers over 50 years [-.388]).

The Home

1. Socio-economic efficiency (number of rooms [.796]; material needs [.700]; father's income [.690]; social class [.678]).
2. Family size (number of occupants [.947]; number of children [.873]; ordinal position [.809]; overcrowding [.724]).
3. Housing (washing and toilet [-.866]; plumbing [-.862]; dwelling type [.707]).
4. Family stability (family structure [.812]; father's employment [.623]; mother's employment [.400]).

Parental Behaviors

1. Home literacy (parents' education [.739]; family library membership [.709]; father's reading [.698]; number of books in home [.588]).
2. Paternal interest (father's control [.784]; father's interest [.772]; father-evening [.760]; father-weekend [.735]).
3. School starting age (age of starting [.825]; preferred age of starting [.808]).
4. Educational ambition (secondary school preference [.791]; preferred age of leaving [.734]; child's reading [.551]).

Parental Attitudes

1. Antimodern teaching methods (old traditional methods better [.857]; children do not learn as much now [.665]).
2. Disciplinary parents (children should be caned [.830]; schools should be stricter [.320]).
3. Antihomework (no homework at primary level [.893]).
4. Teacher accessibility (teachers welcome parents at school [.703]).

Behavioral Attitudes

1. Stricter schools preferred (schools need to be stricter [.590]; knowledge of school before starting [−.453]).
2. Antisupervision (parents have too many other things to do to spend time helping children at home [.756]).
3. Critical of school (children are not as happy at school nowadays [.730]; complaints to school [.681]).
4. Mother-child interest and contact (child talks to mother [.614]; mother-evening time [.361]).

The Pupil

1. Sex of pupil (boy or girl).
2. Pupil attendance (percent school attendance).

Procedure

For each student in each age group there were comprehensive measures of educational performance and of environmental influence. The purpose was to statistically set the measures of educational performance against the measures of the environment, and to observe which aspects of the environment showed the closest association with the educational measures. This was achieved by the use of two types of analysis, factor analysis and multiple regression analysis.

At both 7-plus and 10-plus, the 30 environmental composite variables, together with the criterion scores of the samples of 196 7-plus and 196 10-plus pupils on the tests of intelligence, reading, and mathematics were factor analyzed. This produced Principal Components analyses followed by a Varimax rotation of the first 11 factors at 7-plus and the first 12 factors at 10-plus. These factor analyses pointed to patterns of association between the composite variables and the criteria.

Regression analyses were carried out to examine these associations even more clearly, and at the same time allow estimates of, and comparisons between, the relative parts played by the environmental categories and the individual composite variables (Veldman, 1967). In these regression analyses, the “predictors” were 29 environmental composite variables (sex of pupil was omitted), and the “criterion” was each test score in turn.

Results

The Factor Analyses

Since the factor analyses results merely confirm the multiple regression findings, in the interest of brevity, it is not proposed to examine them in any detail but rather to focus on the regression analyses.

The Regression Analyses

The factor analyses pointed to patterns of association between the composite variables and the criteria, and suggested that variations in home circumstances and school conditions all have “some” effect on the progress of children in school. The regression analyses, with school achievement as the criterion, demonstrates this even more clearly, at the same time allowing estimates of, and comparisons between, the relative parts played by the environmental categories and the individual composite variables.

With sex of pupil omitted, the 29 separate environmental composite variables or predictors can be treated, as in the factor analyses, in eight environmental categories. For each criterion at each age level, each environmental category was taken in turn, with the remaining categories held constant, in order to determine what proportion of the particular criterion variance is independently explained by the various separate single categories in the presence of the others. Environmental category variance was calculated by the difference in R^2 s including all categories and omitting the particular category. Tables 1 and 2 show the percentage criterion variation explained by each environmental category for each educational criterion at each age level.

TABLE 1
MULTIPLE LINEAR REGRESSION ANALYSIS 7+ SUMMARY TABLE:
ENVIRONMENTAL CATEGORIES — % CRITERION VARIATION

Predictor Variables	Criteria		
29 School, Neighborhood, Home, Behavior and Attitude Variables	Intelligence 43.24†	Reading 36.10†	Mathematics 30.26†
Unique contribution:			
8 school conditions	2.64	4.71	5.48
2 school-neighborhood	1.96	0.51	0.91
2 neighborhood conditions	0.75	0.06	0.97
4 home circumstances	1.16	0.38	0.76
4 parental behaviors	9.29†	5.22*	4.87*
4 parental attitudes	0.41	0.34	0.82
4 behavioral-attitudes	2.26	1.00	1.78
1 pupil attendance	0.28	0.02	0.16
Total unique contribution	18.75	12.24	15.75
Residual common variation	24.49	23.86	14.51

* $p < 0.05$ † $p < 0.001$ ‡ $p < 0.0001$

At both ages the residual common variation is very high, demonstrating convincingly that there is a great amount of interaction among the environmental variables, and that when environmental categories are taken independently, very few of them are significant. Environmental forces operate together on educational performance. However, Parental Behavior is clearly extremely important at both ages.

In general, the regression analyses produce a number of important conclusions. First, environmental influences tend to operate together to effect educational performance. Second, at both ages and across all the educational criteria, Parental Behaviors stands out above the other sets of environmental variables in its independ-

TABLE 2

MULTIPLE LINEAR REGRESSION ANALYSIS 10+ SUMMARY TABLE:
ENVIRONMENTAL CATEGORIES — % CRITERION VARIATION

Predictor Variables	Criteria			
29 School, Neighborhood, Home, Behavior & Attitude Variables	Non-verbal 46.02†	Verbal 53.39‡	Reading 54.64‡	Mathematics 45.35‡
Unique contribution:				
8 school conditions	4.73	8.66‡	6.36**	7.89**
2 school-neighborhood	1.14	0.65	0.25	1.42
2 neighborhood conditions	1.61	1.58	0.37	0.45
4 home circumstances	1.12	1.16	2.22	0.49
4 parental behaviors	12.66‡	12.51‡	12.06‡	9.65‡
4 parental attitudes	0.58	1.34	0.91	1.07
4 behavioral-attitudes	4.33	4.58**	5.71‡	4.60**
1 pupil attendance	0.00	0.23	0.50	0.64
Total unique contribution	26.17	30.71	28.38	15.07
Residual common variation	19.85	22.68	26.26	19.14

* $p < 0.05$ ** $p < 0.01$ † $p < 0.001$ ‡ $p < 0.0001$

ent significance for educational performance. Also, this highly influential category increases in significance with age. Third, the best individual predictors of educational performance at both ages are clearly Home Literacy and Educational Ambition, the former being most important at 7-plus, the latter at 10-plus. The contributions of each increase with age. At school, homework is associated with test performance at both ages, while superior library provision in progressive schools and pupil attendance have become important by 10-plus.

For measured intelligence, at 7-plus, the best individual predictors, with percent variation, are Home Literacy (12.8), Educational Ambition (7.0) and Socio-economic Efficiency (6.4). At 10-plus, for nonverbal intelligence, the best predictors are Home Literacy (11.7), Educational Ambition (11.2) and Paternal Interest (5.3), while for verbal intelligence Educational Ambition (16.2) and Home Literacy (11.2) are paramount. The close associations with Home Literacy and Educational Ambition are very apparent, the latter increasing in importance with age.

For reading, clearly the predictors have much more influence at 10-plus than at 7-plus. At 7-plus, the best individual predictors of reading performance, with percent variation, are Home Literacy (7.5), Educational Ambition (5.9) and Formal Methods (5.5), while at 10-plus they are Home Literacy (14.4), Educational Ambition (13.9) and Homework (5.1). As for measured intelligence, Home Literacy and Educational Ambition are the best predictors of reading performance.

For mathematics, the best predictors at 7-plus are Home Literacy (6.0), Homework (5.7) and Socio-economic Efficiency (4.6), and at 10-plus, Educational Ambition (11.9), Home Literacy (7.3) and School Starting Age (4.4).

Comparing measured intelligence, reading, and mathematics, the good predictors in common are Home Literacy, Educational Ambition, Socio-economic Efficiency, and Homework, with the emphasis clearly on the home and the parents.

Discussion

The findings from this investigation of environmental influences on educational performance yield a considerable amount of significant information which is perhaps most clearly summarized by a consideration of the ten original hypotheses outlined in the introduction.

Hypothesis One stated that the School environment should show little association with educational performance in relation to the Home environment. In other words, the variation between schools should be much less than the variation between other environmental areas. Wiseman (1967, p. 365) found that, on the major attainment factor of his Schools Analysis, School contributed only 18 percent towards the total environmental variance while the Home contributed no less than 62 percent. The factor analysis of the present investigation, simplified, produces the following results in Table 3:

TABLE 3
PERCENTAGE ALLOCATION OF ENVIRONMENTAL
VARIANCE IN THE EDUCATIONAL FACTORS

Composite Variables	% Allocation of Environmental Variance	
	7+	10+
School Conditions	8%	4%
Neighborhood Conditions	12%	5%
Home Environment	74%	90%

The 100 percent in each case in Table 3 is completed by School-Neighborhood conditions. It is clear that at each age level the School contributes less than 10 percent towards the total environmental variance while the Home contributes more than 70 percent in each case. The factor analyses not only substantiate the hypothesis, but show that the variations between schools is much less and the variations between homes much more than that found by Wiseman (Wiseman's 1967 survey results came from "school-based" research, with the schools as the units, whereas this present investigation was of individual children with a more intensive examination of the Home and Parent variables). The Regression Analyses show the Home and especially the Parent variables to be independently much more important than the School. With a severe test of significance, School Conditions are statistically independently significant only at 10-plus. In short, the School environment does show little association with educational performance in relation to the Home environment.

Hypothesis Two stated that, within the school environment, the “organizational” variables, as opposed to the “physical” variables, should have the closest association with educational performance. Previous investigations have found only the following school variables to be closely related to achievement: size of class, streaming, homework, progressiveness, and good morale. These are largely organizational in nature. Both the factor analyses and the regression analyses of the present investigation show that following School variables as having the closest associations with test performance: formal methods, homework, teacher stability (older teachers), and superior library provision in progressive schools. Where the School does not exert an influence it is through these composite variables or their reverse. Size of class and streaming do not show any close association with performance. The composite variable of new, well-equipped schools, which draws together most of the “physical” aspects of the school, nowhere shows any close associations with educational performance. A policy of setting homework, informal teaching methods, and a good social atmosphere are the relevant school variables for educational performance.

Hypothesis Three stated that the Neighborhood environment should show little association with educational performance. The factor analyses confirm this, corroborated by the regression analyses. The independent contribution of neighborhood conditions is not significant at either age level or for any criterion.

Hypothesis Four stated that the Home should show the closest associations with educational performance. From the factor analyses of the present investigation, simplified in Table 3, this is clearly the case. At both age levels, on the major educational factors, the Home contributes at least 70 percent towards the total environmental variance. The regression analyses confirm both the degree and significance of this Home influence on educational performance.

Hypothesis Five stated that, within the Home environment, the more psychological indices should show a closer association with educational performance than the physical indices. Both the factor analyses and the regression analyses of the present investigation strongly demonstrate that, overall, the most important variables in the environment for educational performance are Home Literacy and Educational Ambition. Home Literacy is a composite variable made up of measures of the parents’ educational background, the parents’ reading behavior, and the amount of time the parents spend with the child. Educational Ambition is made up of measures of school preference and school leaving age preference. Socio-economic Efficiency, a measure of the parents’ ability to provide for the material needs of the child, and School Starting Age (actual and preferred) are also very important, the former especially so at 7-plus. Paternal Interest is closely associated with test performance at 10-plus. Both types of analyses also bring out the almost complete lack of association between the physical variables of housing and family size and educational performance. It seems clear, therefore, that within the home environment the closest associations for educational performance are with the more complicated influences of home literacy, educational ambition and socio-economic efficiency rather than with the physical influences of housing and material circumstances.

Hypothesis Six, that Parental Attitudes towards education should be most important with regard to educational performance, is very forcibly corroborated by the present investigation. Since this includes measures of Parental Behaviors the findings are best discussed in relation to Hypothesis Seven.

Hypothesis Seven states that, within the Attitude environment, Parental Behaviors reflecting attitudes should have a closer association with performance than the pure attitudes. From the discussion of the important individual variables re-

lated to Hypothesis Five, the close association between parents and educational performance has been established. On the factor analyses, at both age levels, the contribution of Parental Behaviors towards the environmental variance on the major educational factors ranges from 39 percent to 54 percent, whereas the Behavioral Attitudes range from 2 percent to 15 percent, and the pure Attitudes contribute only from 1 percent to 8 percent. The regression analyses provide further evidence for the importance of Parental Behaviors (see Tables 1 and 2). At both ages and for all criteria, the independent contributions of the four Parental Behaviors towards the total predicted variances are in all cases greater than that of the four home circumstances. There is an obvious increase in importance, both in statistical significance and in actual size of contribution of parental behaviors with age. The four behavioral attitudes are also quite important, though much less so than parental behaviors, and they are independently more influential than home circumstances. The four "pure" parental attitudes have only negligible association with test performance. The present investigation has gone a step further than any previous studies such as Wiseman (1967) and Peaker (1967) which suggested the importance of "Parental Attitudes." This present study subdivided Parental Attitudes into behaviors, attitudes and behavioral attitudes, and shows conclusively the statistical dominance of parental behaviors and the unimportance of attitudes as such. It is the behaviors of parents, reflecting their attitudes towards education, that are important rather than the expressions of pure attitudes towards education. It is what parents do or intend to do that is important, not what they profess to feel or think.

Hypothesis Eight stated that the environment has a greater effect on attainment scores than on intelligence test scores. In fact, as can be seen from Tables 2 and 3, the regression analyses do not substantiate this prediction. Apart from 10-plus reading, the environment has a greater effect on intelligence than on attainment. This rather surprising finding is moderated somewhat by the results showing an obvious overall increase in environmental effect with age and a move in the direction of the prediction from complete contradiction at 7-plus to part substantiation at 10-plus. The prediction was based on the work of Fraser (1959), and her sample was made up of 12-plus children. It is possible that when children are younger, the environment has more effect on intelligence than on attainment, but that as they grow older, there is a gradual shift in emphasis until the environment becomes more important for attainment. Certainly this relationship is worthy of further research.

Hypothesis Nine stated that environmental forces should have more influence on reading than on mathematics. This prediction has been established in general, by Warburton (1964) and Wiseman (1967), and is substantiated by the regression analyses of the present investigation (see Tables 1 and 2).

Hypothesis Ten stated that the impact of environmental forces will get progressively stronger with age. To the date of the present study, this had really only been suggested for reading by the work of Peaker (1967). The regression analyses of the present investigation fully substantiate the prediction for measured intelligence, reading, and mathematics. On nonverbal measured intelligence the percentage criterion variation explained by the environmental measures rises from 43.2 percent at 7-plus to 46 percent at 10-plus; on reading from 36.1 percent at 7-plus to 54.7 percent at 10-plus; and on mathematics from 30.3 percent to 45.4 percent at 10-plus. With some qualifications, the impact of environmental forces does get progressively stronger with age. For measured intelligence the difference is slight, but there is a considerable rise with age for both reading and mathematics. Clearly environmental

impact on attainment increases with age much more than on measured intelligence, and it would be interesting to note the comparison at, for example, 12-plus and 15-plus.

In practical terms the present investigation conveys many implications for those involved in education. It must, of course, be borne in mind that correlation is not causation, and that the present study makes no attempt to disentangle the direction of causality, it shows rather the degree of association between aspects of the environment and variations in educational performance. However, Laosa (1982) is probably correct in asserting that, although causal studies in this area will be impossible to do ever because of practical, ethical, and legal consideration, nevertheless simply to know whether or not a relationship exists is in itself of immense value both practically and theoretically. With this in mind, the following points emerge clearly for further consideration and more refined research within the North American context.

The Home environment is much more closely associated with the variations in educational performance than is the School environment. This is no longer an original finding, but the present study shows quantitatively how overwhelmingly important the Home environment is in its associations with variations in educational performance. Also, within the Home environment, for educational performance, the Parents and not the material surroundings are the important influences. Since the present study was concerned with Parental factors within a Northern Ireland educational context, a similar study of parental attitudes and behaviors towards education in the North American context would seem in order in view of the significance of the findings. The present study would seem to underscore the vital need for parental involvement in any attempt to influence educational performance. Although it would require further examination, it is possible that the present study identifies significant environmental influences for the prediction of "children at risk" and gives a new meaning to the term "culturally disadvantaged" in shifting the emphasis away from impoverished material surroundings to impoverished parental support and ambition concerning the education of their children.

Within the School environment, for educational performance, the organizational variables are more important than the physical variables. The suggestion arises that school systems might be better advised to pay much more attention to teacher effectiveness, teaching methods, homework policy, stability, and social atmosphere than to matters such as new buildings, school size, or class size.

The present study raises the prickly issue, which is being and should be further examined within the North American context, that the problems of educational performance can be tackled only through and involving parents. Provision of nursery schools, of huge programs for the "disadvantaged," of remedial techniques, of resource settings, of new teaching methods, of rehousing, of neighborhood facilities—perhaps these are designed to attack the effect and not the cause, certainly their failures are legion especially when parental involvement is minimal. It might be suggested that the battleground can only be within the realm of Parental Behaviors, with a lack within the home of educational ambition, of literacy, and of socio-economic efficiency. Perhaps the responsibility for educational performance should be placed, and accepted, firmly where it belongs—educational performance shows very close associations with variations between parenting variables and very little association with variations between the material circumstances of the home, the neighborhood environment, or the school environment.

Notes

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Time-of-Day Effects upon Children's Memory and Analogical Reasoning

Time-of-day effects on children's incidental visual memory for words and ability to solve verbal analogies was investigated. Thirty-six normal, learning disabled, and educable retarded children were assigned randomly to morning or afternoon learning and recall sessions. All groups showed an afternoon superiority for the immediate recognition of superficially processed words. No time differences were found for words that had been processed at deeper semantic levels. Conversely, the educable retarded subjects were poorer in the afternoon in analogical reasoning. These results cannot be accounted for by single-factor arousal theory but may be related to greater right hemisphere activation later in the school day.

In education, an aspect of time that is often overlooked, or considered so commonsensical that it is rarely questioned, concerns the best time of day for learning certain tasks. Generally, it is felt that the morning is the best time to learn the important, or cognitively demanding, topics while the "soft" topics, or less important topics, should be saved for afternoon scheduling. However, there are several lines of evidence that question this popular assumption.

Firstly, there is the general awareness, amongst most people, that there are "day people" and "night people." Some people feel intuitively that they learn best at night; others feel that the morning hours are their best hours. "Night children," if there are such children, in a day school, may be at a distinct disadvantage for learning in certain areas.

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Secondly, there is a body of research accumulating which suggests certain things are learned best, or performed best, at certain times of the day; whereas, other tasks may be best learned at other times. Early research on this time-of-day effect noted numerous time-based performance fluctuations. Lavie (1980), for example, reviewed a number of early studies that demonstrated human performance differences related to time-of-day. He referred to Lombard's (1887) discovery of a diurnal rhythm for the knee jerk, and Dressler's (1892) report that speed of Morse code tapping showed daily fluctuations, increasing in the late morning, decreasing in the early afternoon and then, increasing again until 1800 hours. Later Bergstrum (1894), using card sorting, memory, reading and arithmetical skills, concluded, according to Lavie (1980), "that complex tasks are more sensitive to diurnal variations than simple tasks" (p. 248). Lavie (1980) also described Kleitman's work in this area. Kleitman, using tasks such as sorting cards, mirror drawing, copying, coding, multiplying etc., found that accuracy and speed of performance were lowest at early morning and late night testing but were highest around midday. And, more germane to our interests, tasks which were increasingly cognitively oriented, such as color naming, were performed better in the afternoon. This finding of enhanced cognitive processing in the afternoon suggests possible educational implications.

More recent research also tends to support the importance of time-of-day for specific kinds of learning. Baddeley, Hatter, Scott, and Snashall (1970) noted that immediate memory for digits was higher in the morning. Also in the area of memory, Folkard and Monk (1978) reported that long term memory (LTM) was superior for material learned in the afternoon, and Folkard (1979) found that morning processing was more acoustically oriented while afternoon performance was more semantically oriented. Specifically, Folkard (1979) found that acoustic similarities in words interfered with a paired-associate task more in the morning than the afternoon; semantic similarities in the words interfered more with afternoon processing. Thus, it would seem that semantically based processing would be more likely to occur in the afternoon. Along somewhat different lines, Mackenberg, Broverman, Vogel, and Klaiber (1974) have reported that performance on overlearned, repetitive types of tasks was superior in the morning while performance on "perceptual restructuring tasks" (e.g., The Embedded Figures Test) was superior in the afternoon. Thus, the research is suggesting, quite strongly, that there are time-of-day differences in learning, and that they are task related.

In summary, it appears that tasks involving rote, short-term memory (STM) and simple, nonelaborative, and overlearned tasks may be performed better in the morning; while tasks that present a greater challenge to a child's integrative learning capacity may be performed better in the afternoon. Afternoon learning may have an advantage on tasks involving delayed retention (Folkard & Monk, 1978), semantic processing (Folkard, 1979), and when cognitive reorganization rather than repetition is required (Mackenberg et al., 1974). Such findings could have significant ramifications with respect to the scheduling of certain academic tasks.

Why the afternoon may be better for elaborative and complex learning is not immediately clear. However, arousal theory, often invoking an inverted-U-shaped function relating performance to arousal, has been offered to explain many of these time-of-day effects including increases in semantic and elaborative processing in the afternoon. Increases in physiological arousal, to a certain point, would be conducive to performance increases; and since it is generally agreed that physiological arousal follows a circadian rhythm over the day (see Folkard, 1982 for a review of arousal theories), with gradually increasing levels (except for a brief decline following lunch) until a maximum is reached at about 2000 hours, it quite logically follows that there would be concurrent performance increases later in the day.

Two hypotheses (attentional bias and cerebral dominance fluctuations) have been offered to explain the basis for this arousal-performance relationship. Following an attentional bias hypothesis Folkard (1982) suggested that heightened arousal during learning may bias attention to some features of the task to be learned and away from others. Similarly, Easterbrook (1959) hypothesized differential cue utilization as a function of arousal; that is, as arousal increases, greater use is made of the more salient features of the stimulus leaving reduced resources for processing incidental features. Presumably, a decrease in the breadth of attention frees capacity for more intensive focused processing. Thus, according to an attentional bias hypothesis, words not processed at deep semantic levels should be more difficult to remember when learning occurs in the afternoon when arousal, theoretically, is at higher levels compared to the morning. At the same time, words processed at the deeper semantic levels should show enhanced processing.

The second hypothesis (cerebral dominance fluctuations) originates in Folkard's (1979) speculation that time-of-day effects on learning may involve time-locked fluctuations in the relative arousal levels of left cerebral hemisphere versus right cerebral hemisphere systems. The prevalence of acoustic confusability over semantic confusability in the morning in word memory led Folkard to hypothesize a shift in cerebral dominance across the day from greater left hemisphere activation to relatively greater right hemisphere activation. But, just as the left hemisphere may be biased for processing acoustic versus semantic verbal information, the right hemisphere is biased for the visual processing of incidental task cues possessing little or no semantic significance (Levy, Heller, Banich, & Burton, 1983). Therefore, Folkard's laterality hypothesis predicts an effect on memory that is in direct conflict to the attentional bias hypothesis. Using a visual, word-memory task, words not processed at deep semantic levels should be *less* difficult to remember when learning occurs in the afternoon.

The present study was designed to explore these two hypotheses by using a recognition memory task, in morning and afternoon test conditions, with words processed on three different semantic levels. Specifically, in line with Folkard's (1979) shifting-laterality hypothesis, it was predicted that words processed incidentally, with little or no semantic support, would be enhanced with afternoon processing due to the right hemisphere bias for the visual processing of incidental task cues. On the other hand, the attentional bias, or cue utilization, hypothesis predicts, for afternoon performance, reduced processing of incidental words and enhanced processing of the more deeply processed semantic words.

Furthermore, both normal and learning impaired subjects were used. The rationale for including the learning impaired emanated from evidence suggesting that some learning disorders may be associated with physiological underarousal (Wender, 1973). Supportive research with heterogeneous samples of learning impaired subjects showing lower basal skin conductance (Satterfield & Dawson, 1971), and reduced physiological responsivity (Buchsbaum & Wender, 1973; Cohen & Douglas, 1972; Satterfield, Lesser, Saul, & Cantwell, 1973; Sheer, 1976) is consistent with the underarousal hypothesis. Thus, arousal theory predicts less marked time-of-day effects in such children.

Method

Subjects

Thirty-six children from three intact classes at the Thomas Gillbard Public School in Cobourg, Ontario, served as subjects. The sample was comprised of eight learning disabled children (5 males and 3 females with a mean chronological age of 12.6 years, $SD=1.4$), a class of eight educable retarded children (3 males and 5 fe-

males with a mean chronological age of 12.5 years, $SD=0.5$), and a class of 20 normal grade-four children (10 males and 10 females with a mean chronological age of 10.0 years, $SD=0.38$). Intelligence test (WISC-R) scores were made available for the two groups of learning disordered children. The learning disabled group were within the average range (full-scale $M=85.9$, $SD=8.32$; verbal scale $M=80.1$, $SD=14.36$; performance scale $M=94.37$, $SD=6.61$) with a large spread between verbal and performance scales ($M=18.5$, $SD=10.98$). The educable retarded group were considerably lower (full scale $M=71.6$, $SD=5.62$; verbal scale $M=72.1$, $SD=8.16$; performance scale $M=75.25$, $SD=5.23$) with a smaller spread between verbal and performance scales ($M=7.1$, $SD=5.4$).

Following stratification for sex, the children were assigned randomly to either a morning group ($N=18$) who were tested between 0900 and 1100 hours, or an afternoon group ($N=18$) who were tested between 1330 and 1500 hours.

Apparatus

The word memory test assessed visual recognition ability using an incidental memory procedure. We began with slide presentations of 10 simple, verbal analogies to be solved, each followed by three word-choices presented consecutively from which the subject, then, was asked to select the word that best completed the analogy. The three word-choices represented three different levels of processing. One-third were correct in that they bore the correct syntactic and logical relationship to the analogy. One-third were semantically related to an element of the analogy but were incorrect, and the remaining one-third were incorrect with no semantic or contextual support to assist memory. For example, the analogy "Red is to stop as green is to . . ." would be presented and read aloud by the subjects; the next slide would be the word "grass," followed by the slide "go," followed by the slide "wet." After the third word-choice had been shown and read orally by the subject, the task was to circle "first," "second," or "third" on an answer sheet to indicate which word-choice was perceived as being correct. Word slides were assigned randomly to the position of first, second, or third following each analogy. Rate of slide presentation was keyed to the child's reading rate. In this memory test, the child was not attempting consciously to commit each of the word-choices to memory; rather, the analogy itself and the sequential order of appearance of the correct word-choice had to be maintained in short-term working memory. The analogies were kept quite simple as the primary focus was recognition memory not verbal reasoning. Immediately following this first phase of the incidental memory test, and completely unexpected by the children, each subject was given a list of 40 words consisting of five words drawn randomly from each of the three word-choice groups and 25 new words chosen arbitrarily. The children were to circle all of the words in the 40-word array that they remembered seeing previously on the screen. A regular Kodak carousel projector was used to show the analogies and word-choices.

Procedure

The children were tested individually in an 8.5m by 3.5m room where the child and the experimenter sat at a desk facing each other. Using the wall as a screen, the slides were projected behind the experimenter and slightly to the left of the child. The children were prepared for withdrawal to the testing room by their classroom teachers in an attempt to allay any anxiety. In addition, all the children were administered, verbally, a questionnaire dealing with family, pets, favorite TV shows, etc., after familiarizing them with the equipment. Each child, consequently, was eagerly awaiting his or her turn to be withdrawn.

On the incidental memory test the children were told that they would be required to view and read a sentence with the last word missing. They would next be shown three words, one after the other, which they were to read aloud, and then they were to circle "first," "second," or "third" on their answer sheets to indicate which word was the correct word to complete the analogy. Assistance was provided by the experimenter if a child misread or did not know a word. Immediately (one to two minutes) after the presentation of the ten analogies the children were given the 40-word array and asked to circle all the words that they remembered seeing from the word-choices seen on the screen. It was stressed that all word-choices should be circled not just correct word-choices. This test lasted five to ten minutes.

Results

On the incidental memory test a three-factor analysis of variance was computed with Group (grade four, learning impaired), Time (morning, afternoon), and Word Category (correct words, incorrect-related words, and incorrect-unrelated words) as the independent variables, with Word Category as a within-subject variable while Group and Time were between-subjects variables. The analysis revealed that there was a main effect for Word Category, $F(2,64)=29.63$, $p<.001$, with more correct words being recalled than incorrect words. This indicates that recognition memory was enhanced by the semantic context generated in solving the analogy. Also, there was a significant Word Category by Time interaction, $F(2,64)=3.61$, $p<.04$, with more incidental words being assimilated in the afternoon. To pursue this interaction, separate two-way analyses of variance for the correct words, the incorrect-related words, and the incorrect-unrelated words were computed. The only effect was a main effect for Time, $F(1,32)=5.23$, $p<.03$, on the incorrect-unrelated words with both groups showing superior performance in the afternoon. These data suggest that both groups may have wider attending horizons in the afternoon and are more alert to peripheral visual-verbal information at that time. Or they may indicate a decline in selective attention later in the day. To determine if there were differences between the educable retarded group and the learning disabled group, separate *t*-tests were computed and all *t* values were less than 1, indicating no group differences. Although the performance on the incorrect-related words was also higher in the afternoon the difference was not statistically significant ($F<1$). Performance on the correct words was very high and, thus, a ceiling effect may have precluded any discriminatory power for this particular subtest. Table 1 presents the data for the word recognition task.

A separate analysis for Sex indicated that there were no Time by Sex effects. Also, two-factor (Group by Time) analyses of variance showed that there were no significant Group or Time effects on the total number of words circled by the children, or their error responses, during the word recognition test.

Analysis of analogy test scores showed no main effects, but there was a significant Group by Time interaction, $F(1,32)=5.19$, $p<.03$. Tests for simple effects revealed that the interaction was due to the learning impaired subjects performing worse in the afternoon when compared with their morning performance. To determine if there were differences between the educable retarded group and the learning disabled group, separate *t*-tests were computed and revealed no differences for the learning disabled group, $t(6)=0.33$, $p=.75$; however, there was a significant difference for the educable retarded group, $t(6)=3.06$, $p=.02$. The poor afternoon performance of the learning impaired group, then, is seen to be due to the educable retarded group. Table 2 presents the test score means and standard deviations for the

grade four and the learning impaired subjects. Table 3 adds the significant subdivision of the learning impaired into a learning disabled and an educable retarded group.

TABLE 1
RECOGNITION TASK RESULTS

Word Category	Normal N=20		Learning Impaired N=16	
	M	SD	M	SD
Correct Words				
Morning	4.6	0.69	4.6	0.52
Afternoon	4.6	0.69	4.1	1.13
Incorrect-Related Words				
Morning	3.0	1.33	2.6	1.30
Afternoon	3.3	1.34	2.8	1.75
Incorrect-Unrelated Words				
Morning	2.7	1.06	3.0	1.31
Afternoon	4.1	0.88	3.4	1.41

Note: Maximum score = 5 for each of the word categories.

TABLE 2
NORMAL AND LEARNING IMPAIRED STUDENTS' RESULTS
ON THE ANALOGY TEST SCORES

Time	Normal	Learning Impaired
Morning	N=10	N=8
M	84.00	92.50
SD	16.47	8.86
Afternoon	N=10	N=8
M	90.00	76.25
SD	10.54	19.95

Note: Scores are expressed in percentage of analogies correctly answered.

TABLE 3
LEARNING DISABLED AND EDUCABLE RETARDED STUDENTS'
RESULTS ON THE ANALOGY TEST SCORES

Time	Learning Disabled	Edücable Retarded
Morning	N=4	N=4
<i>M</i>	92.50	92.50
<i>SD</i>	9.57	9.57
Afternoon	N=4	N=4
<i>M</i>	90.00	62.50
<i>SD</i>	11.55	17.07

Note: Scores are expressed in percentage of analogies correctly answered.

These data, then, suggest that the morning may be the optimum time for utilizing the verbal reasoning skills of the educable retarded; however, the afternoon may be more important when incidental memory is important.

Discussion

Theoretically, the key finding was that both normal children and learning impaired children showed an increased ability in the afternoon to visually recognize words that had been processed incidentally. On the word memory test, children tested in the afternoon did show superior memory when compared with children tested in the morning. However, the improvement was noted only on the incorrect-unrelated words that had been processed when solving the analogy. This afternoon increase in remembering superficially processed words is inconsistent with the prediction of the attentional bias hypothesis which called for reduced cue utilization ability and increased semantic processing in the afternoon. If the children in this study had been displaying enhanced semantic processing in the afternoon we would have expected superior performance on the other two word categories, the correct-words, and the incorrect-related words, since they were more semantically oriented.

A definitive explanation for this effect is not immediately evident; yet, the effect is consistent with Folkard's (1979) hypothesis of a shift from left hemisphere dominance in the morning to right hemisphere dominance in the afternoon. Certainly, the superior visual-perceptual processing noted in the afternoon would be consistent with right hemisphere processing. Furthermore, the effect is consistent with other studies reporting memory enhancement in the afternoon for stimuli with salient visual-spatial characteristics (Jones, Davies, Hogan, Patrick, & Cumberbatch, 1978). Jones et al. (1978) found superior afternoon performance on visual STM tasks but not on auditory STM tasks. Moreover, our results are consistent with Mackenberg et al. (1974) who reported superiority on visual-perceptual restructuring tasks in the afternoon and greater EEG sensitivity to photic stimulation in the afternoon. Thus, there seems to be some converging evidence for enhanced visual processing in the afternoon which may be related to an afternoon shift towards right hemisphere processing.

Immediately obvious educational implications are in the areas of reading and spelling. Both of these tasks require strong visual images. It may be that spelling, for example, could be enhanced by afternoon programming. Certainly, the possibility should be explored, especially with children who have difficulty with spelling. The unexpected finding of poorer verbal reasoning skills in the afternoon for the educable retarded also has educational implications. It may mean that certain subjects that have high demands in the area of verbal reasoning (e.g., mathematics, reading comprehension, and environmental studies) should be scheduled only in the morning for this group, whereas subjects low in reasoning demands (e.g., spelling, word attack skills, and math drill) may be scheduled, more profitably in the afternoon.

The mechanisms underlying the afternoon decline in analogical reasoning in the educable retarded children are obscure. This decrease in verbal reasoning may have been due to fatigue or a decrease in arousal, implicating abnormal diurnal rhythms in the retarded. This may be the case, but its attractiveness as an explanation is reduced by the fact that the retarded did show improved memory for incidentally processed words in the afternoon. And it should be noted that this enhanced memory on the more incidental words, the incorrect-unrelated words, is especially encouraging since it is generally acknowledged that mentally retarded children suffer from serious deficiencies in incidental memory (Fisher & Zeaman, 1973). Thus, the retarded are not manifesting a general depression in performance.

Alternatively, the decline in verbal reasoning, noted for the retarded, also could be viewed as consistent with an afternoon shift away from left hemisphere processing to right hemisphere processing given the left hemisphere's propensity for propositional thinking (Bogen, 1969). Thus, the retarded could be viewed as sluggish in activating the less activated hemisphere, or even more biased than normal children toward increased activation of the right hemisphere.

Thus, these data on the retarded are consistent with Folkard's (1979) speculation of a shift from left hemisphere dominance in the morning to a greater right hemisphere dominance in the afternoon. Moreover, the results are in line with the suggestion by Mackenberg et al. (1974) that there is a hormonally mediated change from adrenergic to cholinergic dominance in the brain in the afternoon.

Thus, the data are promising, with many significant educational implications. However, given the small sample size, conclusions should be considered tentative until replications can amplify the present findings with larger groups of normal and learning impaired children.

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Support of Small School Jurisdictions in Alberta

The study investigated the degree to which small school jurisdictions in the province of Alberta were being compensated for their high operating costs, in comparison to school jurisdictions not designated as small and to the provincial average expenditure. Findings revealed that: (a) jurisdictions with fewer than 500 pupils had operating costs/expenditures on average of five percent more than nonsmall jurisdictions and two percent more than the provincial average operating expenditures, (b) aforementioned small jurisdictions were compensated for about two-thirds of the additional cost per pupil, (c) the jurisdictions with 500 to 999 pupils had operating costs/expenditures on average of 17 percent more than nonsmall jurisdictions and 13 percent more than the provincial average, (d) jurisdictions with 1,000 to 1,499 pupils had operating costs less than that experienced by nonsmall jurisdictions and less than the provincial average expenditure, and (e) although jurisdictions with 1,000 to 1,499 pupils did not experience higher operating costs/expenditures in comparison to other sizes of jurisdictions, the province was providing them with a small amount of support.

The need for special funds to be made available to small school jurisdictions has continued to be recognized by governments. However, associated with this recognition have been the debates on 1) the relativeness of the term "small" and its functionality and 2) the criteria for determining which jurisdictions qualify and for how much.

In the first debate retentionists argue that allowing jurisdictions small in size to exist results in increased involvement of the student and the community in the affairs of the school system. The claim is that the social value that evolves from the smallness of a system not only justifies its existence but stands as a rationale as to why such systems should be encouraged. Those against the retention of small jurisdictions, on the other hand, give little consideration to the above argument. To them, economics must be used as the measuring instrument; and all indications are that the program offerings of small school jurisdictions are insufficient. Clearly, for

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a government to adopt strictly either end of the polar arguments would be an unwise movement. Still, out of necessity or otherwise, jurisdictions of varying sizes do exist and will need differentiated support from the government.

At this point the second debate occurs. Where does a government draw the line? Though problems of the small school jurisdictions are numerous, they are not insurmountable. In some cases, carefully placed funds to offset additional incurred costs may be used to maintain or improve educational quality. The response of different governments varies. For example, in 1981 Ontario drew the line at 4,000 pupils whereas British Columbia based its support line on instructional units; one instructional unit is received for each fractional count and for each school regardless of the number of pupils in the schools.

For the purpose of this paper, the action of the Provincial Government of Alberta regarding the support of small school jurisdictions is subject to examination.

Since 1973, the Alberta provincial government has taken the position that school jurisdictions operating below a set minimum pupil enrolment require additional assistance. This assistance, in the form of a Superintendent's Shared Services Grant, provided support for the joint employment of a superintendent by several school boards with low enrolments. Initially a low enrolment meant that the number of pupils enrolled in the schools of each board could not exceed 600 and the total combined enrolment of those boards who jointly employed a superintendent had to be at least 900. In 1978, these numbers were changed to 700 and 800 respectively. Although many school systems benefited, others which were small but did not share the services of a superintendent did not. This situation is illustrated in Table 1 where from 1973 to 1978 inclusive no county school system received aid though their enrolment count was at times low, whereas 70 percent of the separate school systems received financial assistance. The inequity of this situation was finally recognized and acted upon by the provincial government in 1979. At this time, the Superintendent's Shared Services Grant was replaced by the Small School Jurisdiction Grant. The immediate effect of this change was the broadening of the base of the grant. Now, all school jurisdictions with an enrolment count of fewer than 1,500 pupils were assured financial assistance. Eligibility for assistance increased by 59 percent. Specifically, qualifying small school divisions more than tripled in number, and small counties now numbered eight in 1979, 1980, and 1981. The number of qualifying small public and separate school districts increased slightly.

Given that the intent of the Small School Jurisdiction Grant was to provide some support without encouraging the establishment of small school jurisdictions, the increasing number of eligible jurisdictions became a concern. The question also arose as to the extent the grant compensated small school jurisdictions for their high operational costs. Monitoring the growth in the number of small jurisdictions for the following two years (1980 and 1981) alleviated the first concern (see Table 1). The effectiveness of the Small School Jurisdiction Grant remained to be determined.

Research Design

Sampling Procedure

The population of "small school jurisdictions" was utilized. To complement this provincial examination a stratified sample was also selected. Selection criteria were (1) representativeness of the various types of school jurisdictions qualifying for a Small School Jurisdiction Grant (SSJG); i.e., school divisions, counties, public

TABLE 1

NUMBER OF JURISDICTIONS QUALIFYING FOR A
SMALL SCHOOL JURISDICTION GRANT

Year	Divisions	Counties	Public School Districts	Separate School Districts	Others ¹	Total
1973	2	--	5	31	4	42
1974	2	--	7	31	5	45
1975	1	--	8	33	4	46
1976	1	--	9	33	4	47
1977	2	--	5	32	4	43
1978	3	--	10	34	4	51
1979	11	8	17	38	7	81
1980	12	8	18	39	7	84
1981	13	8	14	39	6	80

¹ Includes Consolidated School Districts, Protestant Separate School Districts, and Roman Catholic Public School Districts.

school districts, and separate school districts, (2) size, as measured by the jurisdictions' eligible enrolment count and (3) geographical location. The resulting sample size was equivalent to 10 percent of the total number of eligible small school jurisdictions.

Method of Analysis

The compensating effect of the Small School Jurisdiction Grant was examined on two levels: provincial and case studies.

Provincial. At the provincial level, jurisdictions were grouped in accordance to their eligible enrolment counts: (1) less than 500, (2) 500 to 999, (3) 1,000 to 1,499, and (4) at least 1,500 pupils. The enrolment count of 1,500 was used as a point of discrimination between small and nonsmall with this number representing the point at which a jurisdiction is no longer eligible for support.

Case Studies. At the second level of analysis, "case studies," representative school jurisdictions within each of the above three enrolment categories were costed on the basis of their expenditures in the areas of instruction, administration, operation and maintenance, and transportation. The required expenditure information was obtained from each jurisdiction's 1980 Audited Financial Statement; 1981 data were not available.

Findings

Enrolments Under 500. School jurisdictions with eligible enrolments of under 500 pupils were, on average, allocating \$130 more per pupil in operating costs than school jurisdictions with a pupil count of at least 1,500, and \$62 more per pupil than the provincial average per pupil operational costs for 1980. This expenditure difference was accounted for by higher instructional and administrative expenditures in the jurisdictions with a low (less than 500) pupil enrolment. On the other hand, these small school jurisdictions were allocating \$246 less per pupil than the

TABLE 2

1980 PER PUPIL COSTS BY JURISDICTION SIZE AND PROVINCE-WIDE

Expenditure Category	\$/Pupil					Provincial
	E < 500	500 ≤ E < 1,000	1,000 ≤ E < 1,500	E < 1,500	E ≥ 1,500	
Instruction	1,752	1,874	1,433	1,725	1,565	1,644
Administration	268	167	141	132	116	169
Operation and Maintenance	231	280	277	318	309	279
Transportation	73	249	163	144	204	170
TOTAL	2,324	2,570	2,014	2,319	2,194	2,262

E = Enrolment

next group of small jurisdictions (500 to 999 pupils). This apparent reversal in trend appears to be due mainly to the low transportation costs for jurisdictions serving a pupil population under 500.

Detailed analysis of the expenditure pattern of a representative sample of jurisdictions serving less than 500 pupils further revealed that: certified instructional salaries account for approximately two-thirds of the total operating expenditures with an average cost per pupil of \$2,377. Yet it must be noted that this high percentage allocation to instructional salaries is representative of all jurisdictions regardless of size. Public utility services was the largest item of the operation and maintenance expense, costing on average \$52.89 per pupil.

The effect of the Small School Jurisdiction Grant was one of providing assistance from a *theoretical* high of \$1,400 per pupil where the jurisdiction's eligible enrolment was zero, to a low of \$41 per pupil where the eligible enrolment count was 499. In practice, the grant compensated jurisdictions with an enrolment count of under 500 pupils at an average of \$41 per pupil. Total number of pupils involved in these designated small jurisdictions was 10,632 for a total average support value of \$435,912.

Enrolments of 500 to 999. School jurisdictions with an eligible enrolment of 500 to 999 were, on average, allocating \$376 more per pupil to operating costs than school jurisdictions with a pupil count of at least 1,500, and \$308 more per pupil than the provincial average. Only in the area of operation and maintenance was the operating cost less than for the more populated jurisdictions.

Again, approximately two-thirds of the total operating expenditure was allocated to professional staff salaries. The average cost per pupil was \$2,172.73. Besides salaries, the expense that consumed a large share of the total was public utility services, at a cost of approximately \$41.28 per pupil. General maintenance and repair services accounted for, on average, \$101.23 per pupil (due to an unusually large expense by one of the selected jurisdictions); otherwise, \$28.55 per pupil.

The amount of provincial assistance provided to these small jurisdictions via the Small School Jurisdiction Grant ranged from a per pupil high of \$41 where the pupil count is 500, to a per pupil low of \$10 when the pupil count is 999. The aver-

age amount of assistance actually provided was \$21 per pupil for a total amount of \$286,377.

Enrolments of 1,000 to 1,499. School jurisdictions with eligible enrolments of 1,000 to 1,499, on average, had an operating cost less than jurisdictions with smaller or greater pupil populations. In agreement with earlier findings, teachers' salaries were the greatest expense costing an average \$2,344.16 per pupil. Besides salaries, the expense that consumed a large portion of available funds was public utility services, approximately \$78.69 per pupil. In comparison with the two previous groups of small school jurisdictions, this amount represented \$25.80 per pupil more than for jurisdictions with enrolments of less than 500 and \$37.41 per pupil more than for jurisdictions with enrolments of 500 to 999 pupils.

Overall, the extent of assistance provided to school jurisdictions with a pupil population of 1,000 to 1,499, ranged from \$10 per pupil to no support when the enrolment count reached 1,499. The actual amount of provincial assistance provided averaged \$5 per pupil or \$93,110.

Summary. Grouping jurisdictions with pupil enrolments under 1,500 by increments of 500 revealed that jurisdictions with an enrolment count of 1,000 to 1,499 experienced the lowest per pupil cost. Furthermore, this cost was \$248 less per pupil than the provincial average. Jurisdictions with an enrolment count of 500 to 999, in comparison, were found to spend the greatest amount per pupil, \$308 more per pupil than the provincial average.

The areas of greatest expense to all small school jurisdictions were salaries and public utility services. The Small School Jurisdiction Grant compensated jurisdictions with enrolments of less than 500 for about two-thirds of the difference in their operating costs while jurisdictions with enrolments of 500 to 1,499 pupils were compensated to a much lesser extent.

Overall, small school jurisdictions spent \$125 more per pupil than jurisdictions with an enrolment count of 1,500 or more. Transportation was the only expenditure area where jurisdictions with an enrolment of at least 1,500 pupils spent less. This finding was in part the result of the comparably low conveyance costs experienced by school jurisdictions with less than 500 pupils. Of the \$125 difference in per pupil operating costs, the Small School Jurisdiction Grant alleviated a maximum of \$41 per pupil or 33 percent of the operating expenditure of "small" jurisdictions.

Conclusions and Recommendations

As suggested from the findings of this study, the amount made available to small school jurisdictions was sufficient to perpetuate them but not to encourage their establishment. The effectiveness of the allocated amounts seemed wanting in relation to the small jurisdiction's ability to maintain and operate its facilities generally.

Steps that could be taken (with the encouragement and support of the Alberta government) to make cost-effective use of facilities include: (1) new heating and cooling systems, (2) maintenance personnel obtaining plumbing and electrical licenses to eliminate costly purchased services in these areas, (3) automatic or manual turning off heat one-half hour before the end of the day; turned on one hour before the start of classes. Although this practice may prove problematic in the dead of winter, the heat could be adjusted to a minimal setting while the building was not in use, (4) decrease heat loss through added insulation and (5) close excess buildings. The current energy conservation program adopted by the government is a movement in this direction.

The action of the provincial government since this study has been to retain the basic structure of the Small School Jurisdiction Grant while increasing the total monies allocated. Yet, to increase allocated amounts incrementally does not truly address the need of the small jurisdiction. Finally, the study strongly indicates that the eligibility cut-off point should be changed from 1,500 pupils to 1,000 pupils. The number of jurisdictions affected is four and their enrolments are closer to 1,500 than 1,000. By making this alteration the provincial government would avoid subsidizing jurisdictions whose per pupil cost was less than jurisdictions having greater or smaller enrolments.

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An Error Analysis on the Raven's Using Feuerstein's Deficient Cognitive Functions

Feuerstein's Learning Potential Assessment Device (LPAD) identifies the deficient cognitive functions (DCF) in a process-oriented assessment format relying on clinical experience to evaluate the various DCFs in the subject's solving process. This study reports an attempt at operationalizing several of the more critical and on the Raven's obtainable DCFs at the Input and Elaborational phase. The devised system was assessed (a) using a sample of elementary and junior high school students, and (b) through a reanalysis of LPAD protocols. High scorers of the school sample made consistently lower errors in one of the three Input deficiencies and in three of the four deficient functions at the Elaboration phase as well. Correlations between reanalyzed clinical protocols of the LPAD and rescored Raven's tests were significant for both Input and Elaboration phases.

Questioning the conventional psychometric forms of assessment as to their relevance and usefulness on the one hand has emphasized the search for a degree of "quantifiability" in problem solving skills as strategies indicative of intellectual functioning on the other. While conventional assessment has been primarily "product-oriented" (Feuerstein, Rand, & Hoffman, 1979), process assessment (problem solving skills) has focused on those "specific covert behaviours, which transform and manipulate information between the time it enters as a stimulus and the time a response to it is selected" (Torgeson, 1979, p. 516).

A distinction has to be drawn here, however, between the term "processes" associated with such approaches as the ITPA (Kirk, McCarthy, & Kirk, 1968) or the DTVP (Frostig, Lefever, & Whittlesey, 1964) and "process-oriented" assessment as used by Feuerstein and his associates. The latter analyzes a variety of cognitive functions, focusing on those which may be deficient within the problem solving process, while concentrating on interactional variables between child, task and the environment (diagnostician) as suggested by Adelman (1971).

In Special Education, the intellectual assessment and reteaching of learning disabled children and those with subnormal levels of intelligence have become the

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focus of intensive study, employing assessment techniques and devices which concentrate more succinctly on problem solving strategies and cognitive functions (*Journal of Special Education*, Special Issue, 1981). Brown and French (1979) reported on recent developments in Russia where attempts have been made to determine the "zone of potential development" (Luria, 1961) of children by adding problem solving clues at failing points in the child's task-solving process. The amount of help needed in the initial situation and transfer of solution strategies to a second but novel task provide evidence of the potential developmental level the child is able to reach with relevant assistance. Since the formulation of the concept of "zone of potential development" by Luria, researchers in several countries have addressed themselves to that topic; noteworthy are: Budoff, Corman, and Litzinger (1974), USA; Flammer (1974), Switzerland; Klein (1973), Hungary; Feuerstein (1971), Israel; and Guthke (1976a,b), Germany. Psychological instruments employed to measure change or potential differ widely, and while some are of recent origin and specifically developed for this purpose, such as the "Mengenfolgetest Type I and II" (Guthke, 1973), others (Feuerstein) use such well established materials as the Raven's CPM and SPM. The most extensive and detailed summary of primarily Russian and German theorizing and research in the area of *Lernfaehigkeitsdiagnostik* (diagnosis of learning capability) has been undertaken by Guthke (1976a,b).

Basically, three major models have emerged so far which are directed at the question of potential higher cognitive functioning, particularly with subnormal individuals. The first has been summarized by Brown and French (1979) who describe "problem solving clue adding" at failing points in the solution process and the transfer of newly gained strategies to novel tasks. Writings by Guthke (1976) represent the second initiative in this area in that he focuses upon *Paedagogisierungsphase* (training phase) between pre- and post-test measures, with changes being indicative of the degree of development given relevant instruction. A third and most detailed approach has been presented by Feuerstein (1979) with the Learning Potential Assessment Device (LPAD) and the compendium work "Instrumental Enrichment" by Feuerstein, Rand, Hoffman, and Miller (1980), a set of remediation procedures.

While all of the three major approaches represent deviations from the conventional psychometric assessment model by being considered "dynamic" rather than "static" (i.e., not assessing what has been learned, but rather the capability of being changed through learning), only Feuerstein et al. (1979) have conceived of the existence of specific deficient cognitive functions which impede the problem solving process. Conventional psychometric assessment is seen by Feuerstein as being product-oriented, with its emphasis on examiner neutrality and client-perceived uninvolvedness in the assessment. In contrast to this, Feuerstein pleads for a change to examiner engagement in the diagnostic process by focusing upon the specific problem solving strategies employed by the client, but especially on those strategies (e.g., spontaneous comparisons and exploratory behavior) which are impaired, lacking or wrongly applied, and on the attitudinal components accompanying the test taking behaviors. Placing emphasis on these components in the assessment instruction, which Feuerstein (1979) conceived of as "process-oriented" assessment, they attempt to observe and temporarily remediate those deficient cognitive functions which the client employs in the "process" of solving the question. Demonstration of improved functioning, albeit temporary, and the application of newly acquired or improved cognitive functions to novel tasks are taken as indicators of cognitive modifiability.

Feuerstein's model of the cognitive act consists of three information processing phases, namely: *Input*, *Elaboration*, and *Output*, with relatively specific cognitive functions operative and ascertainable during each of these phases. A short description of the various (deficient) cognitive functions, by phase, is provided in the appendix.

The LPAD as an assessment instrument of cognitive modifiability employs a variety of task instruments in order to highlight various cognitive functions in the process of problem solving at any or all the three phases. Among the instruments commonly used are: Organization of Dots Test; Raven's Colored Progressive Matrices (CPM) or Standard Progressive Matrices (SPM); Feuerstein's Variations on Raven's-type tasks; Complex Figure test; Plateaux test; Word Association test, etc. Among these various instruments the Raven's CPM and SPM are considered major tests during the administration of which diverse deficient cognitive functions (DCF) are observed. The trained LPAD examiner observes the problem solving process the client employs and through his being involved in the client's problem solving struggle, identifies those deficient cognitive functions (e.g., inferential thinking, trial and error responding, precision and accuracy in data gathering) which prevent the child from actually solving the stated problem. Teaching or eliciting of cognitive functions in the problem solving process permits better observations as to their spontaneous use with more complex or novel tasks, thus providing evidence of cognitive modifiability. In this setting DCFs are observed "in the process of solving" the task at hand.

This investigation proposes a departure from the commonly employed DCFs identification which stresses clinical observation in the solving process; i.e., as derived from situational or contextual cues. It is suggested that an analysis of the error responses of the client permit an identification of deficient cognitive functions. Specifically, error responses as defined by the selection of the distractor items of the Raven's CPM or SPM can be used to identify those DCFs at any or all stages of Feuerstein's tri-phasic problem solving model. Operationalizing and predetermining the nature of the DCF of the distractor item chosen would (1) permit greater observer consistency in identifying the DCF and thus increase interrater agreement, (2) simplify the task of the clinician who through his intervention attempts to overcome the evidenced deficiencies to observe the growth potential, and (3) provide a research basis to investigate the issue of validity and reliability which at some time has to be answered with respect to the LPAD. The basic assumption, then, underlying the proposed change from standard LPAD procedure is that the client is permitted to solve the problem initially without examiner intervention and that the choice the child makes is taken as an indication of his or her problem solving strategies.

Method

Selection of Sample

The subjects comprised the total student population of the elementary grades (Grades 3-6, N=89) as well as all junior high school students (Grades 7-9, N=87) of an inner city school which obtains its pupils from a cross section of the population of an eastern port city. Close to 20 percent of the students came from single-parent families. The mean ages for Grades 3 to 9 were: 9.2, 10.3, 11.4, 12.2, 13.2, 13.8, and 15.1, respectively. Male and female students were almost equally distributed among the seven grades.

Instrument

The Raven's Standard Progressive Matrices (SPM) were administered to all pupils in regular classroom settings after a brief introduction. The protocols were handscored by a graduate student for the number of correct answers. In addition, all error responses were tabulated. A 25 percent random selection of the total number of protocols was rescored by the author for reliability purposes obtaining 98.5 percent agreement after comparing the sample with the total computer stored records.

Operationalized Deficient Cognitive Functions

As has been discussed above, Feuerstein conceives of the cognitive act as consisting of three interacting information processing phases which, for theoretical analysis, can be distinguished as *Input*, *Elaboration*, and *Output*. Concerning Input, Feuerstein et al. (1980) have written:

the input phase include(s) all those impairments concerning the quantity and quality of data gathered by the individual as he begins to solve, or even to appreciate, the nature of a given problem. (p. 73)

Of the several deficient cognitive functions (DCF) at this phase, the following were phrased in operational form in order to identify those distractor items, which when chosen by a subject can be conceived of as expressing the particular deficient function. Clinical experience with the LPAD method of administration and the use of the Raven's test in particular admit that other input functions can be lacking or impaired, but that more inferential steps are involved, and/or that operationalization is hampered due to the complexity of the DCFs. The various DCFs are identified and designated, e.g., I=Input; E=Elaboration together with a suitable subscript which has been chosen with respect to identification of other DCFs on various instruments of the LPAD after further research.

Input Phase	
Abbreviated descriptions of Input Deficient Cognitive Functions	Operationalized definition for the purpose of analyzing error responses on the Raven's
Lack of, or impaired, conservation of <i>size, shape, quantity</i> .	Obvious distortion of any of the given dimensions provided the remainder of the answer is essentially correct. Designated I _c .
Example: Raven's A ₁₂	(items 4, 6)
	B ₂ (items 2, 3)
	D ₂ (items 5, 8)
Lack of, or impaired, spatial orientation and the lack of a stable system of reference that impair the relationship of topological and Euclidian organization of space.	Obvious orientational distortion as figure is turned by more than 45° from the correct position but is otherwise correct in all essential characteristics. Designated I _b .
Example: Raven's A ₁₂	(item 3)
	A ₉ (item 5)
	C ₁₂ (item 6)

Lack of capacity for considering two or more sources of information, dealing in piecemeal fashion rather than as a unit of organized facts.

Use of fewer than the required number of sources of information and no indication of process.* Designated I_d .

Example: Raven's E_1 (items 2, 8)
 A_8 (items 1, 3, 6)
Use of "immediate" (B_{11}) and
"peripheral" (C_6) figures.

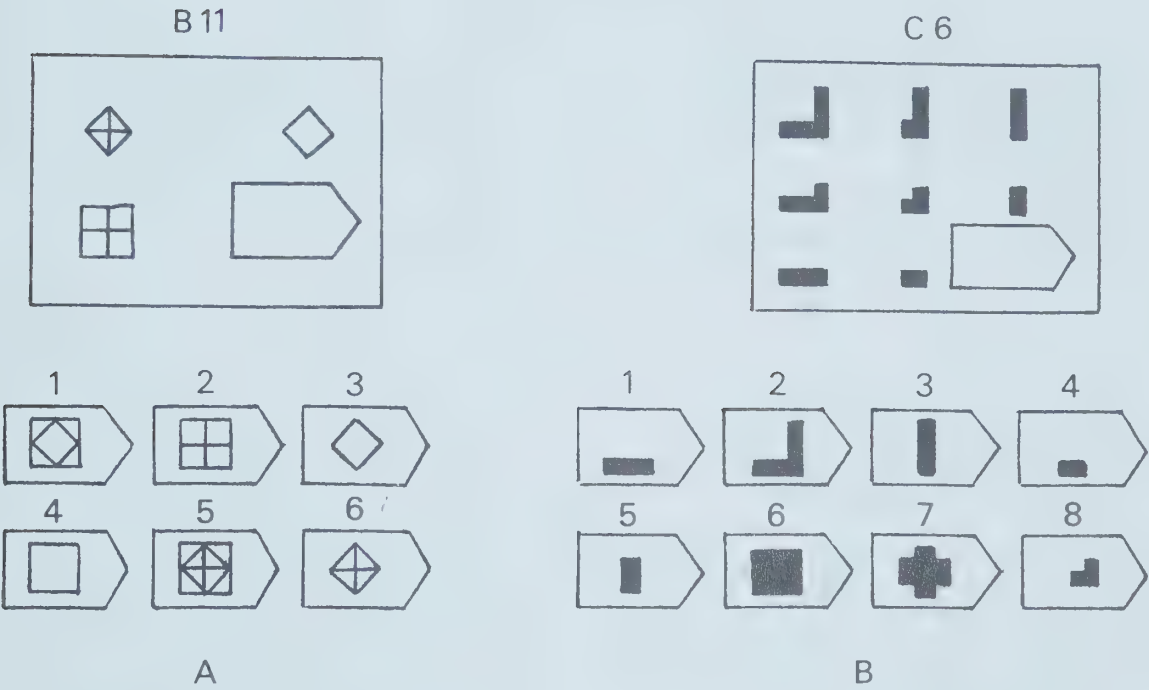


Figure 1. (a) Raven's B_{11} , immediate figures are answers 2 and 3, identified by Raven (1965, p. 34), as "Repetition of Figure,"
(b) Raven's C_6 peripheral figures are answers 1, 3 and 5.

*Process is defined as requiring any mental addition, deletion or manipulation of variables.

Elaborational Phase

The Elaborational phase commonly associated with the internal processing of the gathered information

include(s) those factors that impede the individual's efficient use of the data available to him. In addition to impairments in data gathering, which may or may not have occurred at the input phase, these deficiencies operate to obstruct proper elaboration of whatever cues do exist. (Feuerstein et al., 1979, p. 59)

Of the various impaired cognitive functions at the elaborational phase, the following four have been identified and defined in operational terms. It is understood that additional deficient functions can be observed during clinical assessment as occurring during the problem elaboration, but it was concluded, based on clinical experience, that they can be observed in purer form on other instruments of the LPAD Battery.

Abbreviated Descriptions of Elaborational Deficient Cog- nitive Functions	Operational Definitions for the purpose of analyzing error responses on the Raven's
Inadequacy in experiencing the existence of an actual problem and subsequently de- fining it. Example: Raven's B ₈ (items 1, 3) B ₉ (items 2, 6) C ₈ (items 3, 4, 7) D ₅ (items 1, 3, 5)	No usage of any process and/ or answer totally irrelevant or unobtainable from problem statement. Designated E _a .
Lack of spontaneous compar- ative behavior or limitation of its appearance to a restricted field of needs. Example: Raven's E ₂ (items 1, 4, 8) E ₃ (items 4, 5, 7) C ₆ (item 7) D ₅ (items 6, 7)	No comparison of problem and answer elements as an- swer contains some obvious parts not found in the prob- lem statement. Designated E _c .
Inability to select relevant, as opposed to irrelevant, cues in defining the problem. Example: Raven's D ₂ (items 2, 4, 5, 8) D ₁₀ (items 1, 5, 8)	Uses a process but not the relevant one, or only one when more than one is need- ed. Designated E _b .
Lack of, or impaired, need for summative behavior. Example: Raven's E ₁ (items 1, 4) E ₂ (item 7) E ₄ (items 1, 5)	No combining or extracting processes using two sequence elements. Designated E _d .

The Raven's SPM consists of five Scales, A-E, with six multiple choice answers for Scales A and B and eight choices for subscales C, D, and E. Application of the operationalized DCF to the 372 distractor items frequently results in defining two and occasionally three distractor items by the same operationalized DCF. Typical examples of duplication are such items as: A₂1; C₅ (2, 5); C₁₁ (2, 3, 5). Table 1 summarizes the frequencies of DCF for each of the five Scales with numbers in brackets being those *without* duplication.

Inspection of the frequency data in Table 1 shows that DCFs at the Elaboration phase occur about twice as often as those of the Input phase, and this proportion is maintained after accounting for duplication of DCFs among the distractor items of such specific questions as, i.e., A₂; C₁₁.

TABLE 1
CLASSIFICATION OF DISTRACTOR ITEMS ACCORDING
TO DEFICIENT COGNITIVE FUNCTIONS

	Input DCF						Elaborational DCF								
Scale	I _c		I _b		I _d		E _a		E _c		E _b		E _d		Total
A	13	9	3	3	5	2	15	7	21	10	3	3	--	--	
B	2	1	4	4	18	10	16	10	10	5	10	6	--	--	
C	8	4	1	1	34	12	23	12	13	8	5	3	--	--	
D	3	1	--	--	32	10	19	8	14	6	16	7	--	--	
E	3	3	1	1	11	6	24	10	12	8	16	7	17	9	
Total With/ Without Duplication	29 (18)		9 (9)		100 (40)		97 (47)		70 (37)		50 (26)		17 (9)		372 (186)
			138 (67)						234 (119)						

Results

The data obtained were subjected to several analyses in order to obtain information on (a) differences between grades on *Correct Responses*, (b) distribution of *Error Responses* by Grade and DCF and finally, (c) the predictive power of the obtained operationalized DCFs on clinical data. The results are discussed below according to the formula detailed above.

Correct Responses by Grade

Means by Grade were subjected to an analysis of variance and a subsequent Newman-Keuls test on ordered means. On Table 2 the Newman-Keuls line pattern (Winer, 1962, p. 102) is used to identify significant differences at the .05 level and beyond, between ordered means which are not underscored by a common line. As can be observed from Table 2 the Newman-Keuls comparisons identify Grade 3 as being significantly different from any of the other grades. Grades 8, 6, 9, 7, and 5 do not differ significantly among each other, an outcome which is shared also among Grades 5, 7, 9, 6, and 4. Grades 8 and 4 of the two previous groupings are significantly different at the .05 level. Due to this outcome which shows neither a clear split between the elementary and junior high school results on the Raven's nor a consistent increase over the various grades, a collapsing of various grades for a better analysis is not suggested.

Hi/Lo Analysis of Error Responses

Subjects within each of the seven grades were grouped according to their position above or below the Grade mean of *Correct responses*. Following this, error tab-

TABLE 2
MEANS, SD, ANOVA AND NEWMAN-KEULS
DATA OF GRADE CORRECT RESPONSES

Elementary Grade	<i>N</i>	$\bar{X}$	<i>SD</i>	Junior H.S. Grade	<i>N</i>	$\bar{X}$	<i>SD</i>
3	25	20.2	10.1	7	41	34.4	10.3
4	19	29.1	10.7	8	37	40.8	6.6
5	20	34.2	8.3	9	9	36.0	12.7
6	25	36.5	11.0				

<i>One-Way Anova</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Prob.</i>
Between	6	7136	1189	12.68	.000
Within	169	15.851	93		
Total	175	22.987			

Newman-Keuls Comparisons	<u>3</u>	<u>86975</u>	<u>57964</u>
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ulations by Grade, and Deficient Cognitive Functions were performed which are summarized in Table 3. Also, chi-square analyses were done between hi/lo pairs, and are reported below.

Inspection of the analyzed data reveals that among the Input phase DCFs, the most consistent distinction can be made between hi/lo on the I_d function, i.e., use of limited sources of information, with lower scoring subjects (total correct score) making 11.51 errors against 3.7 for high scores across all grades. Among the four DCFs of the Elaborational phase, subjects with lower total correct scores almost consistently produced higher error scores across all grades for functions E_a =no usage of any process, E_c =no comparative behavior, and E_d =no summative behavior, respectively.

Reanalysis of Clinical Data

Twelve complete LPAD reports were randomly selected from the 40 cases seen during the last 18 months at the Educational Clinic at this university. The twelve selected cases comprised nine male and three female subjects with a mean age of 11 years, 3 months, and SD of 1.6 years. Their IQs ranged from a low of 63 to a high of 84 ($\bar{X}$ =78) as obtained from WISC-R protocols. The twelve protocols of the LPAD assessments were reanalyzed for reliability purposes resulting in 83 percent agreement with previous scoring. The LPAD assessments comprised such tests as the Organization of Dots, Plateaux test, Numerical Progressions, Raven's SPM and Feuerstein's Variations I as well as the Word Association test and the Complex Figure.

The twelve assessments were rank-ordered according to the degree of deficiency at the Input phase and to their corresponding position at the Elaboration phase.

TABLE 3
ERROR ANALYSIS OF DEFICIENT COGNITIVE
FUNCTIONS (DCF) BY HI/LOW X GRADE

DCF	3		4		5		6		7		8		9		$\bar{X}$	
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo
I _c	29	31	19	28	18	15	26	18	43 † 51		30 * 39		12	8	1.86	2.26
I _b	17	24	10	20	6 † 20		8 * 13		22	21	12	15	2 * 5		.76	1.61
I _d	103 † 105		38 † 123		35 † 94		44 † 113		89 † 182		38 † 95		10 † 37		3.7	11.51
E _a	58 † 111		32 * 61		34 † 50		70 † 74		121 † 133		99 * 106		33	18	4.41	7.01
E _c	31 † 79		8 † 40		10 * 20		18 * 26		35 † 48		22 * 32		6 † 18		1.27	1.63
E _b	49	59	30	31	30 * 40		72	57	113	80	85	87	76	11	3.91	4.63
E _d	17 * 38		3 * 14		2 † 16		27	23	31 † 52		17 † 28		8 * 10		.98	1.55
N	12	13	9	10	11	9	16	9	25	16	21	16	6	3		
* exceeds X ² crit. = 3.84 .05																
† = 6.64 .01																
‡ = 10.83 .001																

The twelve SPM protocols were reanalyzed using the operationalized DCFs scoring and also rank-ordered, first according to the degree of deficiency at the Input phase and next in proportion to the extent of deficiencies at the Elaboration phase. Comparisons were subsequently performed between the overall ranking of the selected deficiencies on the total battery, which included the SPM on the one hand and the operationally reanalyzed and rescored SPM on the other. Comparisons between LPAD derived ranks and the SPM protocols at the two phases, Input (I) and Elaboration (E), resulted in the following Spearman “p” correlations summarized in Table 4 below.

Inspection of the correlational comparisons indicates a substantial agreement at the Input phase between LPAD ranked and SPM ranked data, and a lower but still significant agreement at the Elaboration phase.

Discussion

Hi/Lo Analysis of Errors

With respect to the Hi/Lo Analysis of Errors subjects on all grade levels scoring below their respective mean for that grade produced more errors in all DCFs but significantly more so in I_d=use of limited sources of information. This category (I_d=40) appears more than twice as often as I_c (18) among the input distractor items of the SPM. Inspection of the type of error would suggest that I_c and I_b distractor items contain more obvious error elements for the subjects and are chosen therefore less frequently. Items measuring lack of, or impaired conservation of size, shape and quantity (I_c) and impaired spatial orientation (I_b) were not sufficiently subtle to discriminate and will have to be tested with subjects functioning at lower intellectual levels. With respect to I_d, Feuerstein (1979) has re-

TABLE 4

RANK-ORDER COMPARISONS BETWEEN INPUT AND ELABORATION
PHASE OBTAINED DCFS USING LPAD AND SPM PROTOCOLS

	Input		Elaboration	
	LPAD A	SPM A ₁	LPAD B	SPM B ₁
A	--	.93**	.62*	.56*
A ₁		--	.54*	.67*
B			--	.52*
B ₁				--

* $p < .05$ $R_{Ho} (.05) = .506$ $N = 12$
** $p < .01$ $(.01) = .712$

peatedly pointed out that lower functioning individuals frequently evidence difficulties or demonstrate a “lack of capacity for considering two or more sources of information.” While I_c and I_b represent primarily visual-perceptual elements, apparently well developed in the studied population, I_d as a deficient cognitive function expresses more the number of items attended to and submitted to elaborational processing. It can thus be seen as a more demanding operation on which lower functioning subjects failed more often.

The results of the analysis of the DCFs for the Elaborational phase show consistent significant differences between the two groups (above/below group mean) for almost all grades. Subjects belonging to the “below” groups of almost all grades made significantly more use of “irrelevant responses” (E_a), chose significantly more often answers which contained elements not derivable from the question statement (E_c), and finally also selected more often answers which are evidence of lack of summative behavior (E_d). The category E_b (use of a process but not the right one) did not discriminate despite good distribution among the distractor items of the whole test and is in need of redefinition within the Raven’s tests or has to be observed on another instrument of the LPAD.

Reanalysis of Clinical Data

While the large group comparisons serve only as evidence of the discriminatory power of the devised scoring system, the real test of its usefulness was evaluated in the reanalysis of the LPAD battery protocols in which the SPM was one of several other instruments. Despite the relatively small sample of 12 out of 40, the total number of recent assessments, the identified DCFs on the SPM correlated well at both the Input and Elaboration phases with the total deficit observations of the LPAD cases. The SPM, or for a younger population or lower functioning subjects, the CPM, are both major instruments within the LPAD battery and therefore inevitably contribute major insights into the functioning of the assessed subjects. The attempted procedure of relying on predefined response errors can be considered a more time efficient but still valid addition or partial replacement of subtests in the LPAD battery. One of its major advantages lies in its potential to evaluate groups

of subjects which Feuerstein has attempted with the LPAD group test which, however, does not permit the finely tuned analysis evident in the multiple-answer format of the Raven's test, since response items of the Group test serve the dual function of distractor items for some questions as well as being the correct response for a particular question. Further analyses with the scoring system are necessary, particularly with identified subgroups who manifest specific learning or functioning disabilities.

In summary, this study examined an operationalized scoring system as a guide to the identification of deficient cognitive functions (DCFs) observed in the dynamic assessment of low functioning individuals. Seven DCFs, three at the Input and four at the Elaboration phase, were operationalized and all distractor items of the SPM were identified as belonging to one of the seven deficient cognitive functions. Using the derived scoring system SPM, protocols of tested individuals were analyzed and their results, in terms of deficient functions, correlated with existing clinical data. The SPM-obtained results supported the data established in clinical assessment at an earlier date.

Appendix

Deficient Cognitive Functions

Impaired cognitive functions affecting the Input level include those impairments concerning the quantity and quality of data gathered by the individual as he is confronted by a given problem, object, or experience. They include:

1. Blurred and sweeping perception.
2. Unplanned, impulsive and unsystematic exploratory behavior.
3. Lack of, or impaired, receptive verbal tools which affect discrimination (e.g., objects, events, relationships, etc. do not have appropriate labels).
4. Lack of, or impaired, spatial orientation; the lack of stable systems of reference impairs the establishment of topological and Euclidian organization of space.
5. Lack of, or impaired, temporal concepts.
6. Lack of, or impaired, conservation of constancies (size, shape, quantity, orientation) across variation in these factors.
7. Lack of, or deficient, need for precision and accuracy in data gathering.
8. Lack of capacity for considering two or more sources of information at once; this is reflected in dealing with data in a piecemeal fashion, rather than as a unit of organized facts.

Impaired cognitive functions affecting the Elaborational level include those factors that impede the efficient use of available data and existing cues:

1. Inadequacy in the perception of the existence and definition of an actual problem.
2. Inability to select relevant vs. nonrelevant cues in defining a problem.
3. Lack of spontaneous comparative behavior or limitation of its application by a restricted need system.
4. Narrowness of the psychic field.
5. Episodic grasp of reality.
6. Lack of, or impaired, need for pursuing logical evidence.
7. Lack of, or impaired, interiorization.
8. Lack of, or impaired, inferential-hypothetical, "iffy" thinking.
9. Lack of, or impaired, strategies for hypothesis testing.
10. Lack of, or impaired, ability to define the framework necessary for problem solving behavior.
11. Lack of, or impaired, planning behavior.

12. Nonelaboration of certain cognitive categories because the verbal concepts are not a part of the individual's verbal inventory on a receptive level, or they are not mobilized at the expressive level.

Impaired cognitive functions on the Output level include those factors that lead to an inadequate communication of final solutions. It should be noted that even adequately perceived data and appropriate elaboration can be expressed as an incorrect or haphazard solution if difficulties exist at this level.

1. Egocentric communicational modalities.
2. Difficulties in projecting virtual relationships.
3. Blocking.
4. Trial and error responses.
5. Lack of, or impaired, tools for communicating adequately elaborated responses.
6. Lack of, or impaired, need for precision and accuracy in communicating one's responses.
7. Deficiency of visual transport.
8. Impulsive, acting-out behavior.

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Entry Beliefs of First-Year Preservice Teachers

This report details the findings of a study of preservice teachers' entry beliefs concerning education, teaching, and students. Ten students, enrolled in their first year of a four-year Bachelor of Education program, were interviewed to determine values and beliefs concerning teaching and learning with which they entered their teacher training program. Differences between beliefs espoused by first-year Education students (n=48) and first-year students enrolled in Arts (n=36) and Science (n=37) programs were also examined.

The findings revealed that Education students tend to enter their program with liberal educational perspectives. In addition, it appears that there are relatively few significant differences in the educational perspectives of first-year Education students and those in Arts and Science faculties.

Inquiries into teachers' classroom behaviors, employing ethnomethodologies, have pointed to the function that values and beliefs play in these behaviors. This is understandable, when one considers that the very nature of interactive teaching involves the formulation of judgments based upon perceptions of student behaviors and other events (Wodlinger, 1982).

Kelly (1955, p. 46), in his Theory of Personal Constructs, explained that the formulation of a judgment is a mental process through which events, such as student classroom behavior, are "psychologically channelized" by an individual's perception of them. Human beings, Kelly continues (1970, pp. 3-4), extract meaning from events based upon predictions of their occurrence and the degree to which these occurrences confirm or disconfirm the predictions made.

Following Kelly's reasoning, first-year preservice teachers, having no experience in classrooms as instructors, should have little construed meaning of the events occurring in the classroom from the perspective of teachers. However, they will have construed meaning from and will have placed value upon events occurring within the classroom from the perspective of students. Their experiences as stu-

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dents in elementary and secondary classrooms will have enabled them to form perspectives and beliefs concerning life in classrooms.

These perspectives, that is, the perspectives students and teachers hold of classroom life, are different. Using an accepted definition of perspective as “a coordinated set of ideas and actions a person uses in dealing with some problematic situation [that refers] to a person’s ordinary way of thinking and acting on a situation” (Becker, Greer, Hughes, & Strauss, 1961, p. 34), it may be said that teachers have ways of thinking about their work in classrooms that are different from ways in which students think about their work in classrooms. Not only are teachers’ and students’ ways of thinking about their lives in classrooms different, but a difference may also be found in their beliefs about life in classrooms and in the meaning they give to these beliefs through their actions (Tabachnick, Popkewitz, & Zeichner, 1980).

The Study

This study is an investigation of entry beliefs about education held by first-year students of a four-year Bachelor of Education program. These beliefs were compared to the entry beliefs about education held by first-year students enrolled in Arts and Science programs.

Phase One

The purpose of Phase One of the study was to generate a set of belief statements about education held by first-year Education students. These beliefs were the data used for Phase Two of the study.

Ten students were selected to participate from the first-year student body. Given the nature of the data collection process as outlined below, with only one interviewer, it was felt that ten was a suitable number.

In keeping with the cautions about role socialization of teachers, articulated by Moskowitz and Hayman (1974), the following criteria were used in selecting the participants:

- a. Each participant was registered in the first year of a four-year BEd program.
- b. None of the participants was to have registered previously in a BEd or other teacher training program.
- c. A participant must have had no previous experience as an instructor in public or private schools or with day care centers.
- d. No member of the participant’s family was to have had any formal instructional or formal teacher-aide experience with private, public or day care centers.

An equal number of male and female participants was ensured. With the view that values, beliefs, and personal experiences are influencing factors in individuals’ decision processes, the following two questions were addressed:

1. What values and beliefs concerning teaching and learning do teacher-trainees bring to their first-year Education program?
2. Are there significant differences between the beliefs and values concerning teaching and learning held by first-year Education students and first-year students enrolled in other faculties?

Methodology

Methods employed in Phase One of the project were clinical in nature. Participants were not observed in classrooms, but rather in a "laboratory" setting. (First-year students at the institution were not engaged in a teaching practicum.)

Interviews were held with each of the participants. The focus of the interview was the experience that each participant had had in elementary and secondary classrooms.

During the interview, a modified form of Kelly's Repertory Test (Kelly, 1955) was employed and a modified version of Hinkle's Laddering Procedure (Hinkle, 1965) was also used. Each interview was audiotaped and lasted from two to three hours. Through the use of a specially designed content analysis system, the following categories of reported introspective thought data were identified:

1. Beliefs about Learning (n=44)
2. Beliefs about Peer Interactions (n=40)
3. Beliefs about Student-Teacher Interaction (n=29)
4. Beliefs about Effective Teachers (n=33)
5. Beliefs about Teacher Control (n=9)
6. Beliefs about Teacher Satisfaction (n=3)

Treatment of the Data

The belief and value statements identified were converted into a 160-item questionnaire, requiring responses to follow a five-point Likert-type scale: 1 Strongly agree; 2 Agree; 3 It all depends; 4 Disagree; 5 Strongly disagree.

Preliminary Data Analysis. Upon completion of the questionnaire, a random sample of 35 was taken and the input data verified for correct data values. As well, the frequencies of each score were obtained.

Of initial concern was the question:

Were the responses elicited by the participants ones of genuine affirmation of opinion or did the responses constitute an exercise of filling in the boxes?

In order to arrive at an answer, a paired comparison test for differences in contrasting and like question types was conducted. For example, we would expect that responses to two contrasting questions such as:

Q97: A student should know why he is being punished.

Q51: A student should not be told the form of punishment he is to receive. This will make him think about his actions.

should show a significant difference in responses. Furthermore, four items, Q37, Q98 and Q126, Q166, in which Q98 and Q166 were duplicates of Q37 and Q126 respectively, were inadvertently included in the questionnaire and provided another source of confidence in the response validity.

Analysis of paired comparisons assumes that the difference in response for Q51 and Q97, for a particular student, represents an element drawn from a normally distributed population of differences. Expectation of the value of the difference led to the null hypothesis:

HO: The questionnaire responses did not represent the respondents' beliefs.

Setting the alpha level of risk to 0.05, the test statistic

$T = \text{Average Difference} / \text{Standard Error of Difference}$

was compared against the upper and lower ordinates of the student's T distribu-

tion. The outcome of this analysis confirmed the expectation that the questionnaire responses elicited did in fact represent students' beliefs.

Analyses of Grouping Characteristics and Questionnaire Reduction. The next point of interest pertains to the following questions:

- a) Can the questionnaire be as well or better represented by fewer questions?
- b) Are there underlying constructs uniquely grouping several questions together into clusters of questions with similar meanings? If so, how does this clustering compare with the six groups of student teacher beliefs?

To answer these questions, a factor analysis of the beliefs questionnaire was performed. The following points were noted:

1. A total of 49 factors accounting for 82 percent of the total variation were retained prior to the varimax rotation, yielding a 154 x 49 factor matrix.
2. The variables displaying absolute loading levels of 0.45 to 0.80 were isolated from the rotated factor matrix. By sorting on factor number and belief group membership, the clustering patterns of questions could be examined.

Examination of the contents of each group highly loaded upon a common factor revealed that no underlying bond between belief statements could be found. Similarly, by examining the belief statement types clustered upon a common factor, no highly representable factor of a particular belief type could be identified. It appears, then, that the original dataset best describes the overall amount of information collected. The decision to reduce the number of questions analyzed to 35 was a purely subjective one, made without the aid of statistically derived information. One should bear in mind the type of claims concerning beliefs that are to be made and the information necessary to substantiate such claims. Further investigation could perhaps involve the search for common factors for the belief statements belonging to a particular type.

Findings and Discussion

Part A: Belief Statements

The means and standard deviations of responses to the 158 belief statements by first-year students enrolled in the Education Program at a Western Canadian University are to be found in Appendix A. As mentioned above, questionnaire statements were organized into six categories:

1. Beliefs about Learning (n=44)
2. Beliefs about Peer Interactions (n=40)
3. Beliefs about Teacher-Student Interaction (n=29)
4. Beliefs about Effective Teachers (n=33)
5. Beliefs about Teacher Control (n=9)
6. Beliefs about Teacher Satisfaction (n=3)

Responses to the belief statements indicate that education students tend to have a liberal perception of learning. This is shown, for example, by responses that suggest: (a) students need to become involved in their own learning, (b) students want to understand the nature of their learning, and (c) the educational process, as a social activity, is important to society.

The students' responses to the forty statements in the category "Beliefs about Peer Interactions" indicate that they believe the social group is an important element in the academic and emotional climate within the classroom. Obviously, this is a fact well known to educational researchers. However, it is interesting to find that first-year education students have come to that perception. As will be noticed

in Group B statements (Appendix A), students tend to perceive that their views of self and degree of learning accomplished are definitely influenced by their classmates' behaviors and attitudes.

Mean responses to belief statements that focused upon teacher-student interaction lead to the suggestion that these relationships are viewed as extremely important in learning. Again, these responses indicate a liberal perception. For example, Education students tend to see teachers as friends as well as instructors. Respect played an important role in the teacher-student relationship perceptions. Many of the responses indicate the view that teachers' respect for students and students' for teachers lead to positive self-concepts.

Again, mean responses to belief statements about effective teachers indicate a degree of liberalism. Education students view effective teachers as:

- a. displaying helpful behaviors,
- b. maintaining open communications with students,
- c. organized and patient,
- d. allowing students to do their own thinking, and
- e. aiding in the advancement of society.

The response to one such statement appears to be at odds with the majority of statement responses. The statement, "People put labels on others without knowing them ($\bar{X}=1.64$)," would suggest that the respondents view teachers as stereotyping students. It is quite possible that responses to statements such as the preceding reflect what does exist, while responses to statements with stems "A good teacher . . ." reflect what students perceive as "should" be.

The finding that education students display liberal educational perspectives is supported in the literature. Spindler (1955) reported that the educational ideas of student teachers tended to be more liberal than those of practicing teachers. Cummins' (1961) findings concurred with Spindler and led to the speculation that as education students progress through their four-year program, their orientations become more traditional. In similar studies, Yee (1969), Roberts (1969), Jansen (1971), Mahan and Lacefield (1971), and Peterson (1977) reported that the attitudes and values of preservice teachers shifted from a liberal perspective towards more traditional viewpoints, largely as a result of their practice.

Examination of the responses to belief statements concerning teacher control reveals some ambivalence amongst first-year education students. Three belief statements that did elicit some measure of agreement were: (a) *By disciplining students, teachers show they care* ($\bar{X}=2.68$), (b) *A student's interest in learning is the best measure of a teacher's classroom control* ($\bar{X}=2.54$), and (c) *We learn to expect specific behaviors from people* ($\bar{X}=2.14$). The first two of these indicate that the education students equate student control with caring and student learning. This finding is further reinforced by the responses to the third belief statement selected. Teachers will maintain a greater degree of control if they can predict student behaviors.

Findings of research conducted by Hoy and Jalovich (1979) and Hoy and Henderson (1983) are relevant to the study findings pertaining to preservice teacher control beliefs. Results of Hoy and Jalovich's study, focusing on the relationship between the degree of openness of a classroom and a teacher's pupil control ideology, support their hypothesis of an inverse relationship between (a) the "open" attitudes of teachers toward education and knowledge and (b) the degree of teachers' custodial orientation toward student control.

Similarly, in their review of the literature, Hoy and Henderson (1983) have noted a direct relationship between a teacher's "closed" orientation toward education and teaching and the teacher's predilection toward authoritarian, hierarchical student-teacher relationships.

The finding of some ambivalence among first-year preservice teachers, then, is not suprising. Within this group will be a mixture of those who have gone through "open" and "closed" educational experiences and who have a propensity toward either "open" or "closed" educational attitudes. Thus, on average, their responses have reflected this ambivalence. Of interest for future investigation might be the comparison of pupil control beliefs held by those who perceive their public schooling as "open" and those who perceive it as "closed."

Responses to three statements in Group F, "Beliefs about Teacher Satisfaction," indicate that education students perceive a need for teachers to receive both extrinsic and intrinsic motivational feedback. Strong agreement with these statements suggests that the students believe teaching to be more than a job: *Teachers want a sense of accomplishment* ($\bar{X}=1.86$); *Teachers want to know that they have taught people well* ($\bar{X}=1.86$). The students agree less strongly that extrinsic motivation is required for effective teaching: *Teachers need positive feedback to inspire them to keep motivating students to learn* ($\bar{X}=2.32$).

Part B: Comparison of Responses of Education Students and Students from Other Faculties

It was felt that use of 158 belief statements to compare responses of education students and students in other faculties was somewhat cumbersome. Thus, in order to produce a set of belief statements that was perceived to be representative of the beliefs of the respondents and maintain a workable set, the results of a MANOVA were used. The arbitrary cut-off correlation coefficient of 0.75 was used in making this decision. This process produced 35 belief statements in the following groups:

A: Belief Statements about Learning	n=9
B: Belief Statements about Peer Interactions	n=11
C: Belief Statements about Teacher-Student Interaction	n=7
D: Belief Statements about Effective Teachers	n=3
E: Belief Statements about Teacher Control	n=5

A summary of the response means, standard deviations, and comparisons of response means is shown in Table 1.

Table 1 displays mean responses and comparisons of mean responses of first-year students in the BEd program to those of BA and BSc students. To test the significance of the difference between means, a two-tailed *t* at the 5 percent level was considered satisfactory (Bloomers & Lindquist, 1960; Dunn & Clark, 1974). The results of the two-tailed *t*-test are also displayed in Table 1. The minimum levels of significance for the population samples analyzed were ± 1.96 .

1. Differences in Beliefs (BEd vs. BA)

As is displayed in Table 1, there were two positions or beliefs of which the BEd and BA students were at variance. These were:

Students see ideas differently in different contexts.

Narrow-minded people are shallow.

The differences of their means were 2.42 and 2.03 respectively.

With the former (students see ideas differently in different contexts), it appears that first-year BEd students tend to believe this statement more strongly than first-

TABLE 1
MEAN RESPONSES AND COMPARISON OF MEAN RESPONSES
FIRST-YEAR BEd, BA, and BSc STUDENTS
BELIEF STATEMENTS

BELIEF STATEMENTS										

TABLE 1 (cont'd)

BELIEF STATEMENTS	B Ed n = 48		B A n = 16		B Sc n = 37		$\bar{X}_1$ $\bar{X}_2$	$\bar{X}_1$ $\bar{X}_3$	$\bar{X}_1$ $\bar{X}_3$
	$\bar{X}_1$	σ_1	$\bar{X}_2$	σ_2	$\bar{X}_3$	σ_3	t_1	t_2	
C: TEACHER/STUDENT INTERACTION									
People who are loud may be thought of as being rambunctious	2.81	0.82	2.61	0.89	2.76	0.91	0.98	0.24	
If students are not told specifically what it is that they are doing wrong, they may make assumptions that will negatively affect classroom relations	2.08	0.79	2.36	0.79	2.39	0.76	-1.44	1.61	
Students resent teachers who do not “talk their language”	3.17	1.06	3.30	0.84	3.22	1.07	-0.59	-0.22	
If people are not patient with me, I get the feeling I’m not very smart	2.65	0.90	2.92	1.11	2.65	1.14	-1.21	-0.26	
Generally teachers talk-down to students	3.00	1.08	3.22	1.16	3.22	1.02	-0.94	-0.99	
Teachers tend not to interact “on the same level as students”	2.60	0.91	2.69	0.99	2.85	0.90	-0.42	-1.25	
D: EFFECTIVE TEACHERS									
Teachers only teach what the student needs to know	4.02	0.90	4.03	0.73	3.86	0.81	-0.05	0.79	
A good teacher tends to be open-minded about activities within the classroom	2.02	0.69	2.00	0.67	2.08	0.88	0.11	-0.30	
A teacher can determine the level of student understanding by observing students’ behavior	2.60	0.73	2.92	0.79	2.51	0.89	-1.66	0.45	
E: TEACHER CONTROL									
Teachers want to show that they are right	3.08	1.00	2.94	1.05	2.67	1.03	0.625	1.86	
It is appropriate for female teachers to use corporal punishment measures	3.65	0.88	3.51	1.08	3.65	1.05	0.63	0.45	
* Female teachers have more trouble with discipline than male teachers	3.37	1.07	3.50	0.93	2.78	1.00	-0.60	2.69	
By disciplining students, teachers show that they care	2.67	0.80	2.69	0.84	2.68	0.74	-0.09	-0.05	
We learn to expect specific behaviors from people	2.15	0.612	2.19	0.77	2.11	0.73	-0.22	0.22	
When a teacher has a pleasant nature, learning is more fun	1.65	0.80	1.78	0.75	1.58	0.55	-0.67	0.39	

$\bar{X}$ = Mean
 σ = Standard deviation
 t_1 = B Ed -B A
 t_2 = B Ed -B Sc
*Significant differences

year BA students. This leads to the speculation that with regard to this belief, first-year BEd students seem to be more liberal than first-year BA students. With the latter (narrow-minded people are shallow), it appears that first-year BA students tend not to occupy as firm a position as first-year BEd students.

2. Differences in Beliefs (BEd vs. BSc)

An examination of Table 1 reveals six instances in which first-year BEd students differed significantly from first-year BSc students in their responses to the belief statements. These instances were:

1. Students see ideas differently in different contexts ($t=2.17$)
2. The best learning occurs without obstruction ($t=2.05$)
3. An inactive person is more patient than an active person ($t=2.05$)
4. Narrow-minded people are shallow ($t=2.35$)
5. There is usually one person in the classroom who causes problems ($t=-2.33$)
6. Female teachers have more trouble with discipline than male teachers ($t=2.69$)

With the exception of one of these statements (5—There is usually one person in the classroom who causes problems), first-year science students seem to agree more strongly with the belief statements than do the education students. These differences in statements 1, 2, and 3, dealing with student learning, tend to suggest a more flexible, more liberal position. This position is also reflected in the differences in statement 5, but, strangely enough, reversed in statement 4. Both deal with peer interactions.

Responses to the sixth belief statement, at first glance, appear to imply that Science students have a negative perception of female teachers' abilities with classroom discipline as compared to Education students. However, it was determined that students enrolled in the first-year Science program were predominantly male, while students in the Education program were predominantly female. Thus, there is evidence to suggest that first-year male students enrolled in Science have a more negative perception of female teachers' abilities at classroom control than do first-year female Education students.

Summary

The study had two main foci, (a) the identification of entry beliefs about education held by first-year Education students, and (b) the comparison of entry beliefs held by Education students to those held by Arts and Science students. There were two distinct phases to the study. Phase One was designed to generate a set of belief statements about education by ten first-year Education students (5 male, 5 female). The belief statements obtained were transformed into a 160-item questionnaire that was completed by members of the first-year class ($n=48$).

Phase Two of the study involved a comparison of the educational beliefs held by first-year Education students and first-year Arts and Science students.

Beliefs Held by Education Students

The evidence obtained through the study suggests that Education students enter their programs with liberal educational perspectives. This may be more easily understood when realizing that, upon entry into their Education program, the subjects held perspectives of secondary school students; their experience constructs, carried into the university classroom, are those of secondary school students. It logically follows, then, that as preservice teachers progress through their training, their

perspectives change from those of students to those of teachers. Although this perspective change is supported by the literature, the process by which the change occurs is, at present, merely conjecture.

Specifically, it may be concluded that first-year Education students believe that:

1. The social group is an important element in the academic and emotional climate within the classroom.
2. Views of self and degree of learning are influenced by peers' behaviors and attitudes.
3. A teacher's respect for students and students' for a teacher lead to positive student self-concept.
4. Effective teaching is:
 - a) a helping set of behaviors,
 - b) the maintenance of open communications,
 - c) organized and patient,
 - d) developing student thinking, and
 - e) an aid to the advancement of society.
5. Teachers' student-control behaviors demonstrate concern for student welfare and learning.
6. Teachers will maintain a greater degree of control, if they can predict student behaviors.
7. Teachers need both extrinsic and intrinsic motivational feedback.
8. Teaching is more than just a job.

Belief Comparisons

As the data revealed, there is relatively little statistically significant difference in the responses among the various categories of respondents. This leads to the suggestion, then, that students entering the first year of an Education, Arts, or Science program, have similar beliefs about education, teachers, and classroom interactions.

However, caution must be exercised in the conclusions drawn, based upon both the manner in which the belief statements were collected and the rationale for selecting the 35 listed belief statements. With the former, it was assumed that the ten students selected for Phase One were representative of all first-year Education students. There was no confirmation sought that indeed this assumption was valid.

The latter decision (to reduce the number of questions) was a purely subjective one. It was made without the use of statistically derived information.

It appears that the results of this study have raised more questions than they have answered. There is indeed a good deal that is not known about the beliefs of teacher-trainees or about how preservice teachers' beliefs and perspectives change from those of secondary school students to those of inservice teachers. This seems to be an area that would profit greatly from in-depth, systematic research.

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APPENDIX A

BELIEF STATEMENTS, MEAN RESPONSES AND STANDARD DEVIATIONS

<i>GROUP A</i>		
BELIEFS ABOUT LEARNING		
	$\bar{X}$	n = 44 σ
Students who respect teachers learn more.	2.14	1.131
People learn by putting small pieces of information or skills in steps.	2.18	0.766
Students see ideas differently in different contexts.	1.86	0.895
The best learning occurs without obstructions.	2.72	1.040
People do not learn from their mistakes.	4.50	0.755
People have to know that there is some reason for their activities.	1.94	0.580
An assured person will always try his best.	2.42	0.724
Open-minded people believe learning is important.	2.26	0.716
Students recognize their inappropriate behaviors.	2.74	0.890
Education is a life-long experience.	1.26	0.559
People want to make their own decisions.	2.14	0.849
There is a direct relationship between self-assurance and success.	2.04	0.773
People must learn for themselves.	2.26	0.976
An inactive person is more patient than an active person.	3.62	0.936
Students will not do something unless they are made to do it.	3.54	0.805
Students learn more in a classroom where the unexpected and unpredictable occur.	2.84	0.946
Students with nervous behaviors are not aware of their actions.	3.22	0.878
People like to accomplish.	1.44	0.668
People want to be independent.	1.96	0.847
There is an emphasis on memorization in elementary grades.	2.54	0.963
Learning is challenging.	1.50	0.640
Listening is the most important skill in learning.	2.20	1.039
It is right and proper to conform with society.	3.04	0.856
There is a direct relationship between what a person learns and his/her emotional state.	2.43	0.926
It is fun in school.	2.40	1.000
A good student is responsive and listening.	2.52	0.854
A student must be able to apply a skill or concept before he will learn it.	2.36	0.768
Something is important to me only if I can identify with it.	2.78	0.923
Students in a classroom function better when they are all doing the same thing.	2.96	0.958
New ideas are challenging.	1.68	0.646
Students cannot function in an unstructured environment.	3.14	0.959
One of the better ways of learning is through asking questions.	1.66	0.710
Learning is easy.	3.76	0.950
Something that is beneficial and important can be fun.	1.76	0.763
People have to know that their activities will be of benefit to them.	2.22	0.807
People who are intelligent are learning.	3.04	0.979
Learning is a social activity.	2.14	0.633
Students learn for themselves.	2.32	0.968
It is important that students learn how to learn.	1.56	0.605
There is more to school than academic learning.	1.68	0.676
In order for me to do an effective job, I must enjoy what I'm doing.	1.46	0.754
A quiet person is a settled person.	3.46	0.754
Students want to learn.	2.52	0.781
Students cannot function in an unstructured environment.	3.14	0.917

GROUP B

BELIEFS ABOUT PEER INTERACTIONS

	$\bar{X}$	n = 40 σ
A self-assured person is a friendly person.	2.76	0.709
Students don't enjoy being embarrassed.	1.62	0.977
School provides students with a sense of security.	2.80	0.825
It is difficult for me to interact with others when I feel defensive.	2.16	0.880
A person who is labeled as bad won't have many friends.	3.00	0.825
Students work better as a group than as individuals.	2.94	0.645
I don't want to be seen as being wrong in front of my classmates.	2.38	0.914
I don't like narrow mindedness. It makes it harder to get along with people.	1.98	0.747
There is a direct connection between the support a student receives from his friends and his feelings of self-confidence.	2.06	0.810
Students don't want to associate with boys labeled as bad.	3.04	0.799
Students need to share their problems with others.	1.90	0.755
Open communications is important in my interactions with people.	1.74	0.716
Peer pressure prevents students from speaking out in class.	2.20	0.894
It's important for me to know what other people are thinking.	2.46	0.805
Narrow minded people are shallow.	2.94	0.968
People who don't learn are ostracized and have a stigma attached to them.	2.89	0.950
People view themselves as good.	2.62	0.660
If I am confident in my abilities, other people will be also.	2.12	0.863
Learning is more socially acceptable than not learning.	2.02	0.869
I don't want to be seen as being wrong in front of my classmates.	2.50	0.806
Being with someone who is happy makes me happy.	2.06	0.947
When I am with someone who has a great deal more knowledge than I have, I feel inferior.	2.86	0.849
Problems lose their importance when they're shared with others.	3.12	1.240
Students who have social control do poorly in school.	3.67	0.682
When I am lonely I feel depressed.	2.26	0.890
People don't like to admit that they are wrong.	2.14	0.825
People are willing to make compromises in their interactions with others.	2.42	0.724
Smart students are not socially popular.	3.64	0.794
There is usually one person in the classroom who causes problems.	2.34	0.908
School is full of excitement when someone even dares to break the rules.	2.84	1.03
A child's thinking is influenced by his peers.	1.78	0.701
In order for something that I discover to be important, it must have meaning for others.	3.32	0.968
People who are smart are prestigious.	3.42	0.851
Most people are in school for other reasons than to listen to teachers.	3.06	1.103
Boys are afraid to be embarrassed by female teachers criticizing them.	2.88	0.886
Educated people have learned how to behave in socially accepted ways.	2.72	0.873
I feel isolated when I can't communicate with others.	2.06	0.785
If I was with someone who has a great deal more knowledge than I have, I'd be justified in feeling inferior.	3.32	0.904
There is a direct connection between the support a student receives from his classmates and his attitude toward school.	2.22	0.672
When students feel embarrassed they lack self-confidence.	2.48	0.964

GROUP C

BELIEFS ABOUT TEACHER-STUDENT INTERACTION

	$\bar{X}$	n = 29 σ
There is a direct relationship between a student's self-confidence and the amount of feedback received from the teacher.	2.18	0.817
Little children don't have confidence in themselves.	3.82	0.817
People who are loud may be thought of as being rambunctious.	2.82	0.825
Students remember negative teacher-student interactions more often than positive teacher-student interactions.	2.32	0.989
A student's sense of self-worth comes from positive interaction with teachers.	2.14	0.664
If students are not told specifically what it is that they are doing wrong, they will make assumptions that will negatively affect classroom relationships.	2.10	0.806
Showing favoritism to one student will create bad feelings amongst other students.	1.61	0.822
A student's self-image is directly affected by a teacher's behavior.	2.62	0.772
The quality of teacher-student relationships deteriorates when teachers yell at students.	2.62	0.957
Teacher-student relationships have a direct bearing on a student's learning.	1.94	0.834
When students have a different view than teachers, the student's view is usually wrong.	3.96	0.979
Students resent teachers who do not "talk their language."	3.12	1.062
People do not like to be criticized.	1.98	0.905
It's embarrassing to be corrected by a teacher.	3.12	0.840
When there is a positive relationship between teachers and students, students feel secure about school.	1.94	0.732
If someone talks down to me, I have a feeling that I am inferior.	2.48	1.005
Students are helped when they know where they stand academically and socially.	2.52	0.854
People react to hostility by becoming defensive.	2.26	0.657
In order to respect teachers, students must trust teachers.	2.02	0.648
Teachers are also friends to students.	1.92	0.868
If people aren't patient with me, I get the feeling I'm not very smart.	2.66	0.908
A student will learn more if he likes the teacher.	2.08	0.796
Showing favoritism to a student who lacks self-assurance will help him develop self-confidence.	3.08	0.934
I've got to be good in school.	2.16	0.809
Students appreciate direction and control from the teacher.	2.44	0.752
Students will respect and respond to teachers who show personal interest in them.	1.98	0.812
Teachers tend not to see more than one point of view in dealing with students.	3.18	0.953
Teachers tend to form judgments of students early in their relationship and carry these judgments throughout the year.	2.34	0.972
When a teacher has a pleasant nature, learning is more fun.	1.64	0.794

GROUP D

BELIEFS ABOUT EFFECTIVE TEACHERS

	$\bar{X}$	n=33 σ
An effective teacher has a helping attitude.	1.48	0.699
An effective teacher maintains open communications with students.	1.55	0.672
Teachers who are open-minded are respected in the classroom.	2.46	0.727
Teachers only teach what the student needs to know.	4.04	0.893
A good teacher is organized.	1.80	0.894
A good teacher tends to be open-minded about activities within the classroom.	2.00	0.693
A good teacher is patient.	1.34	0.681
A good teacher remains calm and approaches problems in a rational manner.	1.70	0.781
A good teacher allows students to do their own thinking.	1.90	0.831
Generally, teachers talk down to children.	3.02	1.104
An effective teacher cares about student progress.	1.40	0.632
A good teacher provides a lot of time to practice skills.	2.12	0.682
A good teacher helps teach children to distinguish between right and wrong.	1.96	0.720
The prime consideration of a teacher is the student, not the classroom nor the curriculum.	2.44	1.023
A good teacher has a lot of participation from students in the class.	2.10	0.728
An effective teacher has an interest in the subject material.	1.64	0.656
A good teacher is interesting and humorous.	2.00	0.693
Teaching is important to society.	1.44	0.779
A good teacher will be able to identify students' learning difficulties and teach to those difficulties.	1.86	0.748
Teachers aid the advancement of society.	1.90	0.640
A good teacher has a pleasant, approachable manner.	1.78	0.729
An open-minded approach in the classroom will confuse students.	3.66	0.738
It's much easier to understand what students are thinking by asking them questions than by judging through observation alone.	1.90	0.806
A good teacher understands students.	1.80	0.693
Teachers tend not to interact "on the same level" as students.	3.08	0.913
A teacher needs to actively understand what students are saying.	1.78	0.641
The teacher is a model for student learning.	2.00	0.721
A good teacher makes the curriculum interesting.	1.78	0.695
A good teacher is unpredictable in his teaching behaviors.	3.32	0.926
A teacher can determine the level of student understanding by observing students' behaviors.	2.62	0.718
A good teacher is easy to talk to.	1.76	0.650
People put labels on others without knowing them.	1.64	0.656
A good teacher is confident about his knowledge in talking with children.	1.80	0.529

GROUP E

BELIEFS ABOUT TEACHER CONTROL

	$\bar{X}$	n=9 σ
Teachers want to show that they are right.	3.12	0.993
It is appropriate for female teachers to use corporal punishment measures.	3.70	0.900
Female teachers have more trouble with discipline than male teachers.	3.42	1.021
Size is a measure of a teacher's classroom authority.	3.46	1.06
By disciplining students, teachers show that they care.	2.68	0.786
A student's interest in learning is the best measure of a teacher's classroom control.	2.54	0.876
We learn to expect specific behaviors from people.	2.14	0.600
A teacher who becomes excited about minor classroom events will lose credibility.	3.10	1.00
A student should not be told the form of punishment he is to receive. This will make the child think about his actions.	3.28	1.088

GROUP F

BELIEFS ABOUT TEACHER SATISFACTION

	$\bar{X}$	n=3 σ
Teachers want a sense of accomplishment.	1.86	0.693
Teachers want to know that they have taught people well.	1.82	0.622
Teachers need positive feedback to inspire them to keep motivating students to learn.	2.32	0.859

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Correlates and Effects of Training in Make-Believe Play in Preschool Children

Make-believe play observations were made of 59 day care children, aged 2 to 5 years, during morning free play. The children were also administered individually certain cognitive and affective measures. Pretend play training emphasizing "open-ended fairy tale enactment" was given to an experimental group of 15 children in eight 20-minute sessions over two months. A matched control group received mastery tasks. Age and sex differences in make-believe play were found. Teachers' ratings of make-believe play correlated significantly with empathy, and Matching Familiar Figures Test errors. The training was effective in enhancing children's pretend play and facilitating novel responses in children.

According to Fein's recent review on pretend play (1981), a "third wave" of interest in pretend play emerged in the early 1970s, stimulated in large by the work of Piaget (1962), Sutton-Smith (Herron & Sutton-Smith, 1971) and Singer (1973). Singer's volume (1973) reported a series of experimental studies on make-believe play. To Singer, make-believe play "represents not simply a natural development at a certain stage of the child's growth, but also has the potential for development of a series of cognitive skills" (1973, p. 200). Singer suggested that make-believe play disposition in children might be related to verbal coding skills, the cognitive dimension of reflection-impulsivity, and field-dependence or field-independence. In addition, Singer also suggested that affective variables such as empathy, the ability to take another person's perspective, might also be implicated in make-believe play, for it provides the opportunity for practicing a variety of make-believe selves and roles.

A number of training studies have shown positive effects of pretend training on make-believe play and on a number of outcome variables, especially with lower class children (Fein, 1981). A variable of interest to the present study was associative fluency in children, which has been found to be facilitated by make-believe play training (Dansky, 1980). However, few training studies have used a pre- and

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post-assessment design of spontaneous play (Fein, 1981) with children matched on observed make-believe play scores.

Furthermore, certain training strategies which have been found to be promising, such as adult involvement, and story-enactment (e.g., Saltz, Dixon, & Johnson, 1977; Iannotti, 1978) warrant greater attention. Enactment of fantasy stories, or thematic-fantasy play, used by Saltz and Johnson (1974) and Saltz et al. (1977) in their intervention studies, is similar to Smilansky's (1968) sociodramatic play in that it involves verbal role enactment in a group, but differs from it in that thematic-fantasy play involves real fantasy, enacting roles which are not observed in real life. Thus, according to Saltz and Johnson (1974, p. 624), thematic-fantasy play demands more than "what is usually meant by the imitative behaviour so central in sociodramatic play; it demands imagined behaviour." Their thematic-fantasy play story-enactment approach emphasized dramatizing the story, remembering the story sequence and verbalizing the reasons for the events in the story. However, from this investigator's clinical experience, there is reason to believe that adding "as if" elements to the story plot, leaving it open-ended, might pose a further demand on the child to *imagine*. Thus, one might expect greater facilitation in imaginative play for children to be trained in the enactment of *open-ended* fairy tales.

The present study was undertaken therefore to: (a) further examine the relationship between make-believe play and certain aspects of cognitive and affective functioning in young children; and (b) systematically investigate the effect of pretend play training on make-believe play and on certain cognitive and affective measures. The training program was designed to focus on pretend, "as if" elements with the introduction of a new element—the enactment of *open-ended* fairy tales.

However, the examination of the training effects was limited only to the immediate effects after training. No follow-up was undertaken to determine the long-term effects, a limitation which needs to be recognized.

Method

Subjects

All the 59 children enrolled in a city-subsidized day care center in Calgary participated in the study. The center was established primarily to meet the needs of the single-parent family, the marginal income family, and the family defined as "socially in need." Because of absences, complete pretest data were available for only 53 children, 29 boys and 24 girls, ages from 27 months to 69 months. This consisted of 8 children in the two-year-old room, 15 in the three-year-old room, 13 in the four-year-old room, and 17 in the five-year-old room.

For the training study, the design entailed the formation of two matched comparison groups. An experimental and a control group were formed, matched on the basis of sex, age and observed make-believe score. There was a range of make-believe play scores from low to high, and *t*-test analysis indicated no significant difference in mean score between groups. There were 15 children (8 boys and 7 girls) in each of the experimental and control groups. The 2-year-old subjects were not included in the training study; they were part of the pretesting only for the purpose of examining age changes in make-believe play.

Measures

Make-Believe Play Observations

Two samples of make-believe play behavior were obtained: a 10-minute sample by a pair of observers and a 45-minute videotaped sample, obtained on separate days. Make-believe play behavior was defined as any play behavior which has "pre-

tend” or “as if” elements. The terms make-believe play and pretend play will be used interchangeably here.

Play observation sample 1 (10 minutes). The observations were carried out during morning free play periods in the children’s own rooms. Two trained observers observed independently the same four children at one time for a 10-minute period. They scanned the four children’s behavior one after the other in quick succession, returning to child No. 1 after child No. 4, checking and entering any scorable behavior according to the set of predetermined categories. The categories were: put on costumes; use props in natural functions, in make-believe context; use props in pretend functions; pretend action; verbalization in make-believe context; and pretend role. Interobserver agreement, calculated by dividing the number of agreements by the number of agreements plus disagreements, was 91.2 percent.

The two observers’ records were then combined as single protocol for each child for rating purposes. These protocols were then rated on Singer’s (1973) scale of imaginativeness. The categories were: (1) Is extremely unimaginative in his or her play; (2) Is slightly imaginative in his or her play, occasionally introducing fleeting pretend elements into play situation but does not stay with any pretend situation for very long; (3) Shows a moderate amount of pretending in his or her play, but not very original or removed from the actual stimulus situation; (4) Shows a substantial amount of pretend elements in his or her play, spontaneously creating make-believe situations, showing some originality in his or her pretending, not changing activities very often; and (5) Shows high originality in the ways he or she uses toys and play material (Singer, 1973, pp. 265-266).

Two raters who were not the same as the observers, rated the protocols independently assigning each subject a score from 1 to 5 for imaginativeness, with 5 being highly imaginative. The interrater reliability was high and significant ($r = .87$). Where disagreement was evident, the protocols were reviewed by the raters and a score decided upon between them.

Play observation sample 2 (45-minute videotaped sample). A 45-minute videotape was made in each room for each group, again during a morning free play period. The camera systematically moved slowly around the room, focusing on a small number of children at a time, usually not more than four, so that the entire room was covered four times during the 45-minute period. In other words, all children would be covered about four times, with the occasional exception when a child left the room or changed activities very frequently. The videotape was viewed and each child was rated by the same two raters who scored the 10-minute sample protocols, on Singer’s scale of imaginativeness. A product-moment correlation coefficient was computed between the children’s make-believe play scores from play samples 1 and 2. A moderate and significant correlation was obtained ($r = .54$, $p < .01$). The two scores were therefore summed to constitute the subject’s observed make-believe play score, with a range of 2 to 10. It was on the basis of this combined score that the experimental and control groups were formed.

Teacher’s Rating of Make-Believe Play

The teachers were also asked to rate each child on Singer’s rating scale for imaginativeness.

Alternative-Uses Test

An alternate-uses test was employed as a measure of associative fluency. The material consisted of a paper clip, a paper towel, and a screwdriver, and the child

was asked to name possible uses for each of the three objects, being encouraged to give as many uses as he/she could, up to 15 for each item. The test evolved from Wallach and Kogan's (1965) work on creativity. The responses were scored as either standard or nonstandard according to a method used by Goodnow (1969). Novel responses would be the nonstandard responses. The range of scores was from 0 to 15.

Say-and-Tell

Part 3 of the Say-and-Tell Test from the CIRCUS assessment battery (ETS, 1974) was used as a measure of a child's ability to use language in a narrative form, i.e., productive language. The task involved showing the child a colored picture of a busy circus ring and asking the child to "make up a story to go with it." Three scores were obtained: the total number of words in the child's story, the number of different words in the story, and quality measure. The quality score was based on the number of elements (range 1 to 12) in the story which indicated elaboration, for example, a verb, a modifier, a plot, feeling, etc. In addition, the response time was also recorded.

Matching Familiar Figures Test

The Matching Familiar Figures Test (MFFT; Kagan, Rosman, Day, Albert, & Phillips, 1964) is a measure of reflection-impulsivity. The preschool version used in this study was developed by Lewis, Rausch, Goldberg, and Dodd (1968). It consists of two practice and 18 test items, each consisting of line drawings of familiar objects (e.g., dog, cat). In each item the standard drawing is presented with four similar alternative drawings differing in one or more details. The child is asked to pick from the alternatives the one that exactly matches the standard. The number of errors and the response time are recorded. Latency measures were included in this study because response time has been found to be influenced by pretend play training (Saltz et al., 1977).

Preschool Embedded Figures Test

The Preschool Embedded Figures Test (PEFT; Coates, 1972, after Witkins, 1950) was used as a measure of field dependence-independence. It consists of three practice and 24 test items each consisting of a line drawing in which a triangle is hidden. The triangle is the same size and in approximately the same location in each item. The subject is asked to locate the triangle in each drawing. Both the error and latency scores were used.

Self-Concept

A rating scale, consisting of 12 pairs of bipolar adjectives, was administered to assess self-concept. A mirror was used to ensure the young child could identify self in the mirror image by name. After three practice items, the child was asked, "Is _____ (child's name) happy or sad (or small, or weak, etc.)?" The self-concept score is the sum of the positive adjectives checked. This self-concept task is based on the Brown IDS Self-Concept Referents Test, which was used in the ETS Headstart Longitudinal Study (Shipman, 1972). Test-retest reliability for the self-referent responses were .71-.76.

Empathy

A procedure based on Borke's (1971) task to measure empathy in children between three and eight years of age was used. The child was first shown a card with

drawings of four faces depicting the emotional responses of “happy,” “sad,” “afraid,” and “angry,” and was asked to identify the emotion. If the child had any difficulty recognizing any of the faces, the emotion would be identified for him/her. The child was then told a series of eight stories and asked “How do you think the boy/girl (child in the story) feels?” The child was also asked to point to the face that best showed how the child in the story felt. There were eight stories, two each depicting the four emotions (e.g., boy given a big red balloon; the child’s dog had run away). The empathy score is the sum of the emotions correctly identified. Borke (1971) found the task to be more sensitive than earlier approaches because it was well within the response capabilities of the very young child.

Procedure

The design of the study was a pretest-training-posttest one. The pretesting consisted of make-believe play observations and individual testing of all the children. The two-year-olds, however, were not given the MFFT nor the PEFT, as these tasks were thought to be perhaps too difficult for them.

Training in make-believe play was given to the experimental group, in eight 20-minute weekly sessions over two months. The control group also attended eight weekly sessions over the same period, but the control children did the mastery tasks instead.

Posttesting was carried out after training. This consisted of make-believe play observations and individual testing of only the experimental and control children, by the same persons who did the pretests. The examiners did not know which group the children were in.

Training Program

Both the experimental and control groups children attended eight 20-minute weekly sessions over a two month period. The 15 children of each group were divided into two small groups of eight and seven for the play sessions which were held in a quiet, empty room, free of fixtures. The project investigator conducted all the sessions for both groups.

The make-believe play training program featured the following special elements: (a) the use of fairy tale enactment (with familiar and open-ended plot); (b) the use of adult modeling and “entering into play with the children” on the part of the trainer; and (c) the use of music. The program aimed at training in pretense or “as if” behavior in regard to objects, actions, verbalizations and roles. The sessions included both structured and unstructured, adult-directed or child-initiated, and active and quiet table activities. There were three sessions of fairy tale enactment, three of musical pretend activities, and two of structured table activities.

The fairy tale enactment consisted of first telling a familiar fairy tale like “Little Red Riding Hood” and having the children enact a role of choice; then the next time, asking the children to give a different ending, “How would the story end if something else happened?” The children could then make up their own ending and act it out. For the musical activities, the session began with the playing of a “pretend” music tape, with accompanying vocal music and narration and the children pretended to be the friendly giant, little ants, the clown, etc. Then the same music was played but this time instrumental music only without the vocal, allowing the children to create their own interpretation. For table activities, props like pipe cleaners, and a variety of gummed papers of assorted sizes, shapes and colors were used, whereby children were asked to make anything they liked, particularly things they had not thought of or made before.

The control condition afforded these children the same opportunity to interact with other children and the trainer in a small group in the same setting, but they did mastery tasks, such as jigsaw puzzles, coloring picture books, etc. They were also told stories but not asked to act out the stories.

Results

Correlates of Make-Believe Play

Table 1 presents the intercorrelations among all the pretest measures.

TABLE 1

INTERCORRELATIONS AMONG PRETEST MEASURES

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	.11	.24*	.43**	.44**	.35**	.43**	.34*	.21	.31*	.56**	-.38**	-.33**	-.44**	-.26*
Make-believe play														
2. - Observed		.43**	.01	.06	.01	.01	.14	.01	.05	.19	.09	-.11	-.04	.08
3. - Teacher rating			.16	.19	.18	.20	.16	-.10	.17	.46**	-.12	.12	-.33**	.08
Alternate-uses test														
4. - Standard				-.06	.50**	.43**	.25*	-.18	.15	.17	-.09	-.05	.02	.05
5. - Non-standard					.28*	.38**	.28*	.17	.14	.41**	-.09	-.37**	-.26*	-.06
Say-and-Tell														
6. - Total						.90**	.76**	-.19	.21	.40**	.03	-.17	.07	-.12
7. - Different words							.83**	-.05	.14	.50**	-.11	-.06	.04	-.20
8. - Quality								-.06	.20	.40**	.01	-.06	.01	-.28*
9. - Latency									.16	.02	-.34**	.04	-.28*	-.10
10. Self-concept										.35**	-.04	-.18	-.11	-.10
11. Empathy											-.13	-.09	-.24*	-.31*
12. PEFT-Error												.06	.26*	.24*
13. PEFT-Latency													.13	.20
14. PEFT-Error														-.07
15. MFFT-Latency														

*p<.05 **p<.01
(N=53 except for MFFT and PEFT where N=45)

As can be seen, the two make-believe play measures were significantly related ($r=.43, p<.01$). However, while teachers' ratings of make-believe play correlated significantly with Empathy ($r=.46, p<.01$), and with Matching Familiar Figures Test (MFFT) error ($r= -.33, p<.05$), observed make-believe play was not related significantly to any of the measures.

Age was significantly related to most measures, except for observed make-believe play. Empathy also correlated significantly with most measures, i.e., Alternate Uses Test-nonstandard, all Say-and-Tell scores, Self-Concept, and Matching Familiar Figures Test-Errors. Contrary to the usual finding of a negative correlation between response time and errors on the MFFT and the PEFT in school-aged children, no significant correlation between response time and errors was found for this sample of preschool-aged children.

To examine further the age difference in make-believe play, multiple *t*-tests were performed. Table 2 presents the means and standard deviations of the make-believe play scores for the four age groups.

TABLE 2

MEANS AND SDS OF OBSERVED AND TEACHER'S RATINGS
OF MAKE-BELIEVE PLAY SCORES BY AGE

	Yr 2 (N=10)	Yr 3 (N=16)	Yr 4 (N=14)	Yr 5 (N=19)
<i>Make-Believe Play</i>				
- Observed	4.60 (2.10)	5.31 (2.05)	6.07 (2.33)	4.84 (1.21)
- Teacher's Rating	1.40 (.51)	3.19 (.83)	3.21 (.80)	3.00 (1.20)

(SD in brackets)

The mean teachers' ratings of make-believe play for the two-year-olds were significantly lower than those for either the three-, four- or five-year-olds, $t(24)=5.41$, $p<.001$; $t(22)=6.70$, $p<.001$; and $t(27)=4.00$, $p<.001$, respectively. There was no significant difference in means among the three-, four- and five-year-olds for teachers' ratings. As to observed make-believe play, while no significant correlation was found with age, the pattern of means shown was interesting. No significant difference between means was found except between the four- and five-year-olds, $t(31)=1.97$, $p<.05$, in favor of year four. The difference between the two-year-olds and four-year-olds did not reach the .05 level of significance.

Sex differences in observed make-believe play was also found, with boys having a higher score ($M=5.69$) than girls ($M=4.70$), $t(51)=1.95$, $p<.05$.

Training Effects

The effect of training on make-believe play and the cognitive and affective measures is presented in Table 3.

The experimental and control groups were matched on sex, age and observed make-believe play scores. There was no significant difference between the two groups in pretest mean observed make-believe scores ($M=5.20$ and $M=4.67$).

Analysis of variance for observed make-believe scores produced a group effect, $F(1,28)=5.96$, $p<.05$; a pre-post time effect, $F(1,28)=4.36$, $p<.05$; and a group/time interaction effect, $F(1,28)=9.51$, $p<.01$. Examination of the means presented in Table 3 shows an increase from pre to post for the experimental group and a slight decrease from pre to post for the control group. Therefore, we can say the significant difference between pre and post is attributable to the training.

Analysis of variance for Alternate Uses Test nonstandard scores also produced a group effect, $F(1,28)=8.8$, $p<.01$; a pre-post time effect, $F(1,28)=26.8$, $p<.001$; and a group/time interaction effect, $F(1,28)=40.4$, $p<.001$. Examination of the group means presented in Table 3 shows a marked increase from pre to post for the experimental group, and a slight decrease for the control group. Thus the significant increase in novel responses between pre and post is again attributable to the training. In other words, make-believe play training was effective in increasing non-standard, novel responses in the experimental children.

Analyses of variance for the other measures produced significant pre-post time effects for Say-and-Tell total, Self-Concept, Empathy, Preschool Embedded Figures Test errors, and Matching Familiar Figures Test errors, but no interaction effect. This means that play training had no significant differential effect for the two groups on any of these measures.

TABLE 3
MEANS OF PRE- AND POST-MEASURES FOR BOTH GROUPS (N=15)

	<i>Pre</i>		<i>Post</i>	
	Exp.	Con.	Exp.	Con.
Make-Believe Play				
- Observed	5.20	4.67	6.93	4.33
Say & Tell				
- Total	68.80	71.40	48.33	49.13
- Diff. No.	33.00	37.80	29.07	30.87
- Quality	5.60	5.60	5.13	7.07
Alternate Uses				
- Standard	6.20	5.13	4.87	4.73
- Non-Standard	2.13	3.00	8.67	2.33
Self-Concept	9.87	8.73	10.80	10.47
Empathy	4.13	3.73	4.40	5.13
PEFT-Error	19.60	18.80	11.60	13.20
PEFT-Latency	9.03	9.05	7.25	7.23
MFFT-Error	7.13	7.47	5.73	5.73
MFFT-Latency	2.78	3.07	2.97	3.42

Discussion

The study had two goals: (1) to examine the cognitive and affective correlates of make-believe play in preschool children; and (2) to examine the effects of make-believe play training on children's spontaneous play and cognitive and affective functioning. With regard to the first goal, the data show that children's tendency to engage in pretend play based on teachers' ratings is related only to empathy, and to accuracy on Matching Familiar Figures tasks. It makes sense that both pretense and empathy require the child to "decenter" in Piagetian terms, in a role-reversal perspective. However, the training data do not indicate a training effect on empathy as found by Saltz and Johnson (1974), and Saltz et al. (1977). The fact that the empathy measure was related to age, teachers' ratings of make-believe play, nonstandard responses on alternate-uses test, the three Say-and-Tell scores and Self-Concept, might mean that it reflects verbal facility as well as empathy. Clearly, further testing and refinement of this empathy instrument is needed.

The significant correlation between teachers' ratings of make-believe play and MFFT accuracy cannot be interpreted to represent a reflection-impulsivity style, because the lack of a significant negative correlation between MFFT error and latency scores in the data negated the presence of a conceptual tempo dimension in these young children. However, response accuracy may be considered the primary discriminating variable, regardless of age (Block, Block, & Harrington, 1975); and this has been found in this study to be related to tendency of make-believe play.

The findings of age differences in observed and teachers' ratings of make-believe play (a lower mean rating for year two, and higher mean observed make-be-

lieve for year four than year five) lend some support to Piaget's (1962) claim that age changes in the occurrence of symbolic play follows somewhat an inverted U-shaped curve. Piaget predicted a rise and fall in symbolic play approximately between the years of one and six.

The finding of sex differences in observed make-believe score, in favor of the boys, is consistent with that of Singer (1973).

The present study employed a pretest-training-posttest design involving two groups matched by sex, age, and observed make-believe scores. The play training was focused on pretend, "as if" elements using fairy tale enactment (familiar and open-ended plot), adult modeling and role-playing to music. Because only immediate effects were studied, the present results must be interpreted with this limitation in mind. The results indicate that the training enhanced make-believe play in children's spontaneous free play. In addition, the study has also demonstrated that training led to increases in novel, nonstandard responses on the Alternate Uses Test, a finding consistent with earlier studies on make-believe play and associative fluency (Dansky, 1980; Li, 1978). It is of interest to note that the training was not associated with any increase in standard responses on the Alternate Uses Test, nor to the Say-and-Tell task, a storytelling task, a finding contrary to Saltz and Johnson (1974) who found thematic-fantasy play to enhance story verbalization skills. The fact that there was no significant differential training effect on any other outcome measures suggests that the open-ended plot of the fairy tale enactment might be the element associated with the increase in novel responding, for both require the child to provide his or her own response to a familiar plot of a fairy tale, or to the many uses of an object.

In sum, the present findings add to a growing literature on the correlates and effects of training in make-believe play. A major implication for day care and early childhood education is also indicated. If make-believe play can be trained after even a short program of eight 20-minute sessions, over a two month period, and if such training can enhance a child's creative, divergent ability, it follows that systematic training in pretend play would be beneficial, at least in terms of immediate effects, and ought to be encouraged. The training should include, among others, pretend, "as if" elements involving open-ended fairy tale enactment.

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BOOK REVIEWS

CULTURES IN CANADA: STRENGTH IN DIVERSITY. *By Norman Buchignani and Joan Engel.* Regina: WEIGL Educational Publishers Limited, 1983, 96 pp.

Cultures in Canada: Strength in Diversity is somewhat different from books usually reviewed in these pages because it is intended for use as a resource on multiculturalism at the grade seven to nine level. A review of the book must necessarily keep this purpose in mind.

The content of *Cultures in Canada* includes a broad sweep of Canadian history ranging from an account of aboriginal peoples through to the French period, the English ascendancy and the various immigrant waves that populated this country. In both the introduction and the historical overview, there is an attempt to develop an understanding, though not definitions, of the concepts of culture, cultural relativity, cultural change, multiculturalism, human rights and discrimination. Throughout, but particularly in the conclusion, the important questions about native (aboriginal) rights, immigration policy and the treatment of immigrants, human rights and the maintenance of ethnic cultures are raised and debated. The book is sensitive and open in its discussion of opposing views on these issues although the subtitle of the book gives an early clue about the authors' leanings.

Cultures in Canada's strength is its breadth—it discusses everything that ought to be included if one is to understand our diversity and if one is to assess multiculturalism as a policy. The book's strength is also its weakness because a book of 96 pages cannot provide the depth and detail required to adequately develop the topics covered. This is especially so, since care must be taken to keep the material at a level at which the intended audience can comprehend. Perhaps it is an unreasonable expectation but the reader is left wishing that there was more detail about the various ethnic groups mentioned and about the historical events discussed. For example, the early review of the seven major native cultural groups because of its brevity gives little hint of the cultural richness that existed and continues to exist in native cultures. So too with other ethno-cultural groups discussed. It is, after all, this richness that makes diversity a valued element of Canadian society.

In the case of historical events, the brevity of the text means that important information is excluded and even that errors are made. The text, for example, fails to mention the Quebec Act of 1775 and its guarantees to the French. Instead, language and religious guarantees are indicated as being present after 1763. Nor does the text indicate that though such guarantees were formally in place, in reality, Canadiens were often regarded as a conquered people who ought to become proper British subjects, an attitude that, unfortunately, still prevails in some quarters about any group that is not white Anglo-Celtic and Protestant.

One sees a similar incompleteness in the case of the account of the Loyalists who came to Canada because most “felt a strong loyalty to Britain.” No mention is made that they also came because they often could not return to their homes and communities, so strong were the feelings of their neighbors who had fought on the revolutionary side. Similar problems are evident in the accounts of the Manitoba school question, World War I nativism and disenfranchisement of citizens, and the provisions of the new Constitution.

Good but sparing use is made of press excerpts and personal reminiscences to illustrate such things as early white-native contact, the immigrant experience, nativism, discrimination, the effect of immigration policy and other topics. Again the brevity of the text means that the use of such material is not extensive and as a consequence the impact of these materials is not as strong as one would hope. For example, the depth and pervasiveness of anti-immigrant sentiments after 1890 never really comes through. Likewise the humiliation and injustice felt by Ukrainians, Germans, Doukhobors, Mennonites, and later Japanese who were regarded as enemy aliens, is not communicated. These, and other similar instances, are not proud moments in our history but they are crucial to any understanding of ourselves and of the central point of the book—strength in diversity.

Having made these observations, it is important to note that this book compares very favorably with earlier books like *Cultures in Canada* or *Learning about Peoples and Cultures* which are intended for a similar use and for a similar audience, but like these and other resources at this level, too much material is covered too briefly. In the process, the real excitement, power, and drama of important Canadian events and issues is diluted. The format, scope and intent of *Cultures in Canada* is excellent and the book accomplishes a great deal in 96 pages. What might it have done had it been a little longer?

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SCHOOL AND THE WORKPLACE: THE NEED FOR STRONGER LINKS.
Toronto: Canadian Education Association, 1984, 128 pp.

The high rate of unemployment in the 16 to 24-year-old population is one of the most serious problems in society today. This volume is concerned with an approach which apparently has great potential in tackling this problem—namely, more integration between school programs and the working world while the youth are still attending school.

The format of the book is a series of reports from each of the 10 provinces on their involvement with work-related school programs. In addition there are two book-end articles by Alan Clarke; the opening article gives his perceptions of the scope of the problem and the need for solutions, and the closing article gives some recommendations for provincial and federal action. An obvious omission in the book is the lack of a federal government contribution. Granted that education is presumed to be a provincial responsibility, but the world of work is certainly not under sole provincial jurisdiction. It would have been worthwhile to see a statement from the federal government as to how they see their present and future roles in meeting the needs of young people.

It is clear from the Introduction and from Clarke's initial article that the work-related programs on which the provinces were asked to report were those in which students are exposed to workplace experience to varying degrees as part of their secondary school education. Each of the provinces does cover these programs, but a few also cover programs such as vocational counseling, industrial arts, and vocational education. These programs, while important in their own right, are not directly relevant to the topic. A few provinces also cover post-secondary education, as well as provincially and federally funded training programs for the unemployed, which are clearly not school-related.

Care must be taken when examining or comparing programs in these reports since terminology varies widely between the provinces. Thus in comparing the reports of Alberta and Ontario we find the following:

"Work Study" in Alberta refers to work-related activities which are part of a regular school course and for which no separate credit is given.

"Work Experience" in Ontario corresponds approximately to Work Study in Alberta.

"Work Experience" in Alberta is a separate course for credit whereby students are employed in the work force under the supervision and coordination of school staff.

"Cooperative Education" in Ontario corresponds approximately to Work Experience in Alberta.

Similar differences in terminology may be found between the other provinces.

A major conclusion from perusal of these provincial reports is that the most successful and gratifying programs are those of the Work Experience or Cooperative Education nature (as defined above) in which students experience some full-time employment. Some aspects of these programs include:

- Highly motivating to students
- Low dropout rates compared to other High School programs for the same age group.
- Allow employers to evaluate potential employees without commitment. (Many students do find later permanent work with the Work Experience employer.)
- Gives young people the "Previous Experience" which is often required by employers but which is difficult to acquire.

Another unexpected finding is that the most innovative and successful programs are not provincially or federally inspired—they are *municipal* in origin. Alan Clarke makes a plea for direct federal support of work-related programs at the municipal level, but the prognosis of this transpiring seems poor in view of obvious jurisdictional difficulties.

There are several groups who might find much of value in *School and the Workplace*, including vocational guidance counselors, practitioners and students in

educational administration and industrial education, and anyone else who is interested in a detailed picture of work-related school programs across Canada.

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SINGLE-CASE RESEARCH DESIGNS: METHODS FOR CLINICAL AND APPLIED SETTINGS. By Alan E. Kazdin. New York: Oxford University Press, 1982, 368 pp.

With the increasing acceptance of single-case research in learning and behavior, a variety of texts are currently available devoted exclusively to single-case research methodology. Kazdin, a recognized leader in the field, has provided us with still another which does not differ significantly in content from the other available texts, but is well enough written and organized to deserve special consideration.

Single-case research (also known as single-subject research, within-subject research, N=1 research, time series research, and several other names) has been used widely in behaviorism for two decades. It tests hypotheses by repeated measures of dependent variables over time under different experimental conditions. The researcher compares the behavior of a single subject or single group under various experimental conditions unlike group-comparison research which compares behavior among groups. It requires rigorous control of variables and careful measurement. Conclusions are typically drawn by visual analysis of graphs. While both group-comparison and single-case researchers often argue that their chosen methodology is far superior to the other, each has strengths and weaknesses. Single-case research is particularly useful when clearly equivalent experimental and control groups are not easily accessible, when specific conclusions about limited populations are desired, when formative information about the rate of change is desired or when the intensive nature of an intervention makes concurrent application to a large experimental group impractical.

Single-case research is less useful when the experimenter cannot exert direct control over the independent variable (e.g., the weather), when a conclusion about a large population (e.g., Canadian preschoolers) is desired, when the significance of small effects (e.g., increase in mean reading speed of 0.5 words per minute) must be measured, or when only single measures of behavior before and after intervention are accessible (e.g., the self-esteem of students just before and just after their first university class).

Kazdin describes the four major single-case experimental designs: (1) ABAB (reversal) designs, (2) multiple-baseline designs, (3) changing-criterion designs, and (4) multiple-treatment designs. The ABAB or reversal design attempts to demonstrate experimental control by alternately applying and withdrawing an intervention. Repeated measures are made in both the treatment and nontreatment phases to establish the amount of variability in each phase. The subsequent phase is implemented only after stability can be demonstrated in the current phase. If the intervention is effective, changes should occur in the behavior observed each time the intervention is applied and those changes should reverse each time the intervention is withdrawn.

The multiple-baseline design does not require reversal phases. The same intervention is applied at three (or more) different times to different behaviors, in different settings or to different clients after a stable baseline has been demonstrated. If a change in behavior level occurs rapidly after each application of the intervention, but not until the intervention is applied, the intervention can be considered effective.

Changing-criterion designs apply an intervention each time behavior reaches a prespecified criterion level. When behavior stabilizes at this level, the criterion is raised (or lowered depending on the desired effect). This is repeated in steps until a desired level is exhibited. Experimental control is demonstrated by the repeated conformity of behavior level to intervention criterion.

Multiple-treatment designs alternate treatment and nontreatment of two (or more) treatment conditions much more rapidly than reversal designs. Data from these treatment conditions are displayed on the same graph. Differential effects are demonstrated by clear differences between the data paths for the treatments.

A full description of each of these designs, their variations and their combinations makes up the greater part of Kazdin's book. He discusses a wide range of variations and combinations. The explanations of these designs are clear, generally simple and well illustrated by examples and graphs. Kazdin has sacrificed the sophisticated discussion of fine points of these designs (which he has shown himself quite capable of in other writing) for clarity and focus on basic concerns. In doing so, he has directed the book to people new to single-case design and those interested in a review of fundamentals. The researcher with a strong background in single-case research will find few novel insights.

In addition to the design descriptions, sections on observation and measurement, experimental logic, data display, and data evaluation complete the text. These sections are also clearly written, focus on the essentials, and provide additional information of practical value for the researcher. For example, a thorough description of graphic display of data clearly outlines procedures for preparing and analyzing graphs. Sections on internal and external validity are well illustrated with examples of situations researchers may encounter and suggest strategies for decision making to minimize threats to both. The section on statistical analysis for single-case designs provides only a cursory discussion and is clearly not intended to prepare the reader to carry out these procedures, but Kazdin's intent appears to be only to let the reader know that these procedures are available, that they are optional, and what some of the advantages and disadvantages of their use might be.

A few minor flaws are found in the book. If the reader attempts to follow the formula given for computing a Pearson product-moment correlation coefficient, it will rapidly become apparent that a radical has been omitted. Several of the graphs connect data paths across phases although this practice is not recommended by Kazdin or other single-case research design experts. In general, however, the text is extremely well prepared and laid out. Figures and tables are used extremely well to clarify and supplement the text.

This book is highly recommended for entry level courses in single-case research or for those wishing to independently acquire basic single-case research skills. I have selected this book for the within-subject research design course that I am currently teaching at the University of Alberta because the book is both authoritative and clearly written. It is more than adequate to prepare individuals with a basic un-

derstanding of the scientific process sufficient to design and implement a sound single-case study.

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PREPARATION OF MANUSCRIPTS

1. All manuscripts must be typewritten, double spaced, and submitted in triplicate and are not to exceed 25 pages in length.
2. An abstract of approximately 100 words in length, typed on a separate page, is to be included.
3. The author's name and affiliation should appear only on a separate title page to ensure anonymity in the reviewing process; the title of the paper should appear on the first page of the manuscript as a means of identification.
4. Tables must be numbered in Arabic numerals with the word 'Table' centered and in capital letters, e.g., TABLE 4. The heading of the table is to be centered below and typed in capitals. The format of tables should conform to the specifications in the APA Publication Manual.
5. Graphs and charts should be used only if essential. They must be carefully prepared on separate sheets in India ink, ready for reproduction. Graphs must be properly labelled using Arabic numerals, e.g., Figure 3.
6. Each table or figure should be presented on a separate page. The position of tables and graphs should be clearly indicated within the text by inserting at the relevant point the phrase (Insert Table 2 here).
7. Sources should appear in parentheses following the reference, citing the author's name (unless the name appears in the text), the year of publication, and page number if appropriate. For direct quotations, the reference should be cited and the page number given in brackets before the final punctuation of the quotation. The references should be listed alphabetically by authors' last names at the end of the manuscript under the heading, *References*.
8. Explanatory notes, numbered consecutively and identified in the text with a superscript, may be included under the heading of *Notes*. They should be double spaced and placed at the end of the manuscript immediately preceding the *References*. The citing of references and quotations in the *Notes* should conform to the procedures outlined in No. 7 above.
9. Spelling shall conform to *Webster's New Collegiate Dictionary*, except in the case of direct quotations which must conform to the original. Editorial alterations will be made if necessary.
10. In matters of style, the third edition of the APA Publication Manual is considered definitive.

